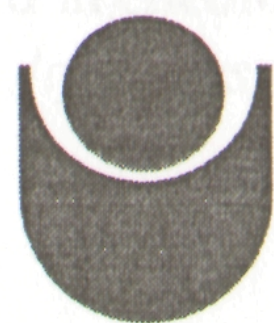


СКАЛНИ И МЕГАЛИТНИ ПАМЕТНИЦИ – ПРОБЛЕМИ И ПЪТИЩА ЗА ТЯХНОТО РАЗРЕШЕНИЕ

МЕЖДУНАРОДНА КОНФЕРЕНЦИЯ
сборник



НОВ БЪЛГАРСКИ УНИВЕРСИТЕТ

София 2001

СЪВРЕМЕННА МЕДИА
ТЕХНОЛОГИИ – ПРОБЛЕМИ
И ПЕРСПЕКТИВИ ЗА БЪЛГАРИЯ
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УВОД

Изсечените в скали и скални масиви паметници /rock-cut monuments / (храмове, изображения, гробници, ниши, сложни култови съоръжения, надписи и пр.) и мегалитите (паметници изградени от големи каменни блокове – долмени, менхири, кромлехи, храмове, гробници и пр.) се срещат по цялата територия на Европа – Индия, Кавказ, Западна и Централна Европа с Британия, Балканския и Иберийския полуостров, Средиземноморието с Мала Азия и Египет, Егейските острови и Малта, по Североафриканския бряг. Можем да ги видим в Южна Америка и на Великденските острови. Скалните и мегалитни съоръжения се появяват още през 3-то хил. пр. Хр. Те са свързани с космогоничните представи на хората и породените от тези представи вярвания. Скални паметници (цели манастирски комплекси и селища в скалите) се създават и функционират през цялото Средновековие, а в някои райони функционират и до наши дни. Много често в изсечените в скали храмови комплекси има фрески. Тези паметници са универсални тополи на вяра и дори когато има смяна на население и на религия, те продължават да играят ролята на сакрални центрове, т. е. те са универсалия в религиозните и културни човешки представи.

Едни от най-ранните скални и мегалитни паметници се намират на Балканите, в Средиземноморския и Черноморския басейн.

Вероятно, защото са много разпространени, много са атрактивни и много загадъчни, скалните и мегалитните паметници предизвикват въображението, но проблемите, които пораждат остават встрани от вниманието на широката общественост. Може би защото са издълбани в камък или направени от камък, те задвижват стереотипа „здрав като камък“, приема се, че след като са издържали толкова векове, може да не се грижим за тях, поради което най-малко внимание се обръща на документирането и съхраняването на тези паметници. Истината, обаче, е съвсем различна. Подложени на климатичните и екологичните промени, на недобросъвестно отношение и вредителство, на безстопанственост и умишлено унищожение, скалните и мегалитните паметници загиват пред очите ни...

Какви са проблемите, които тези каменни хранилища на човешката памет и вяра поставят пред нас?

Специалистите, които се занимават с тях не са много, а в страните от Източна Европа са съвсем малко. Усилията им по документирането, изучаването и съхраняването на тези паметници са повече индивидуални, отколкото координирани. Публикациите на тази тема се появяват в различни археологически, изкуствоведски и исторически списания, но дори не е изработена пълна библиография за поне един район. Добре направените публикации на хартиен носител за тези паметници в Източна-Югоизточна Европа са много малко. Антропологически изследвания, главно статии, за функционирането на скалните и мегалитни паметници се броят на пръсти.

Няма изработена пълна документария за нито един скален комплекс – археологическа, архитектурна, геодезична, анализ на камъка и разрушаването му, фото и видео документаци, събиране на архивни документи за паметника, запис на легендите и представите за паметника на населението, което живее в района и пр.

Не е поставено дори началото на информационна и документална банка за скалните и мегалитните паметници в нито една от страните на Източна Европа. Документацията, доколкото съществува, е разпръсната в различни музеи, институти, отделни специалисти и е практически неизползваема.

Съхраняването (включително консервация и реставрация), експонирането и популяризирането на тези паметници като културно наследство почти винаги остава в сферата на добрите пожелания.

В резултат на двете конференции “The rock-cut monuments of the East and South Europe”, проведени в Молдова (септември 1997) и Грузия (1998) бе формиран международен екип от висококвалифицирани спе-

Дремсизова-Нелчинова Цв., Д. Иванов. Археологически паметници в Русенски окръг. С., 1983.

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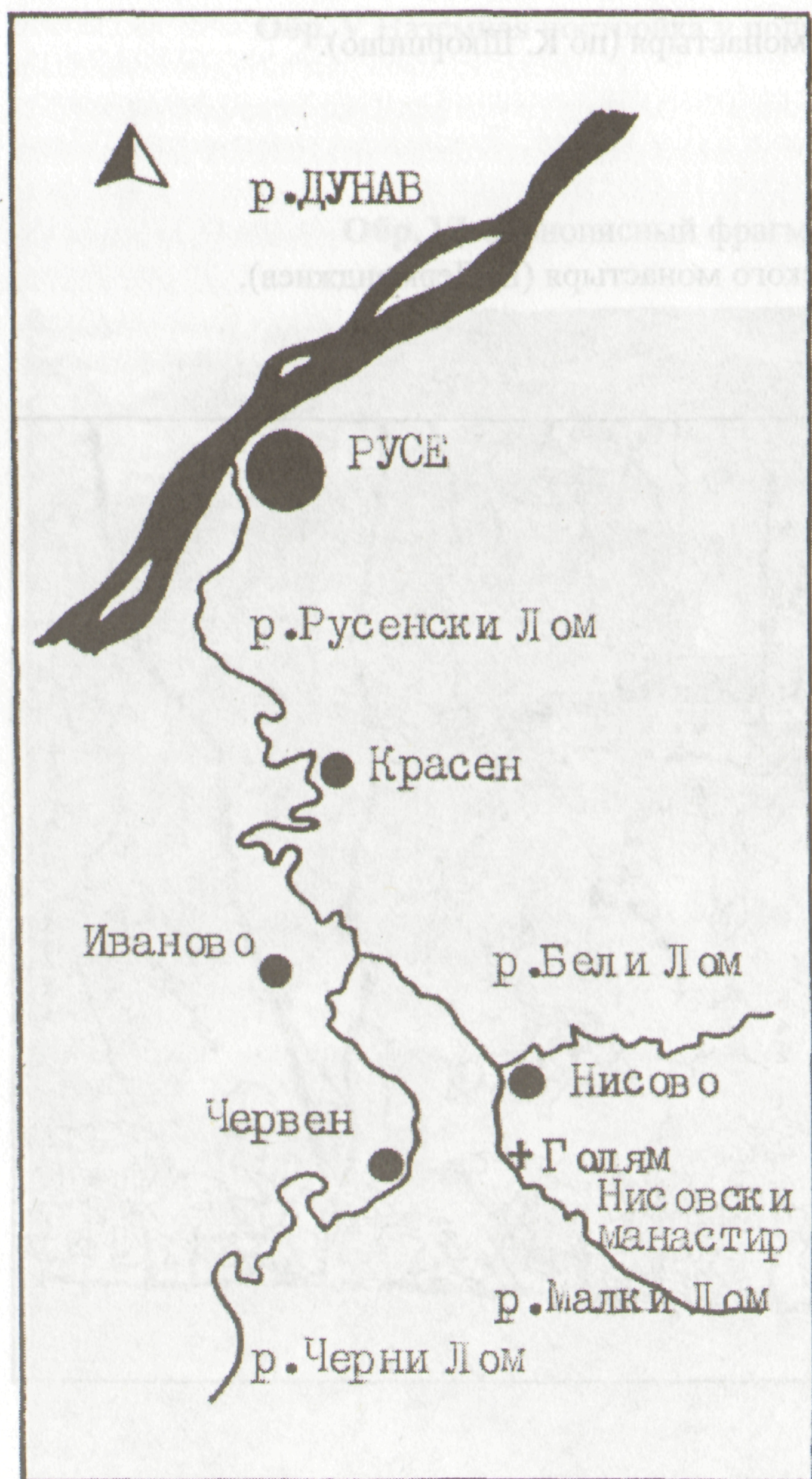
Йорданов, Ст. Архитектурно-пространствени и типологични особености на скалните обители по долината на р. Русенски Лом. – Изв. на Исторически музей – Русе. Т. V. 1998, с. 31-38.

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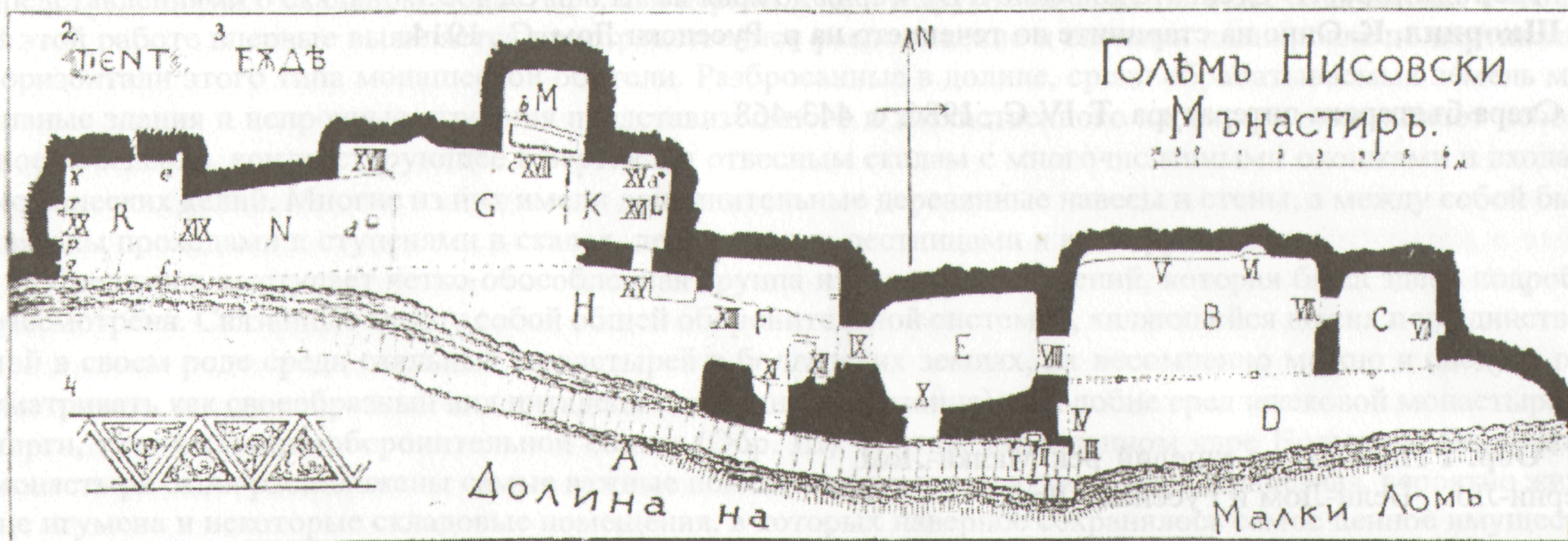
Стара българска литература. Т. IV. С., 1986, с. 443-468.

Обр. I План-схема ущелий рек Малки-Лом, Черни-Лом, Бели-Лом и Русенски-Лом.



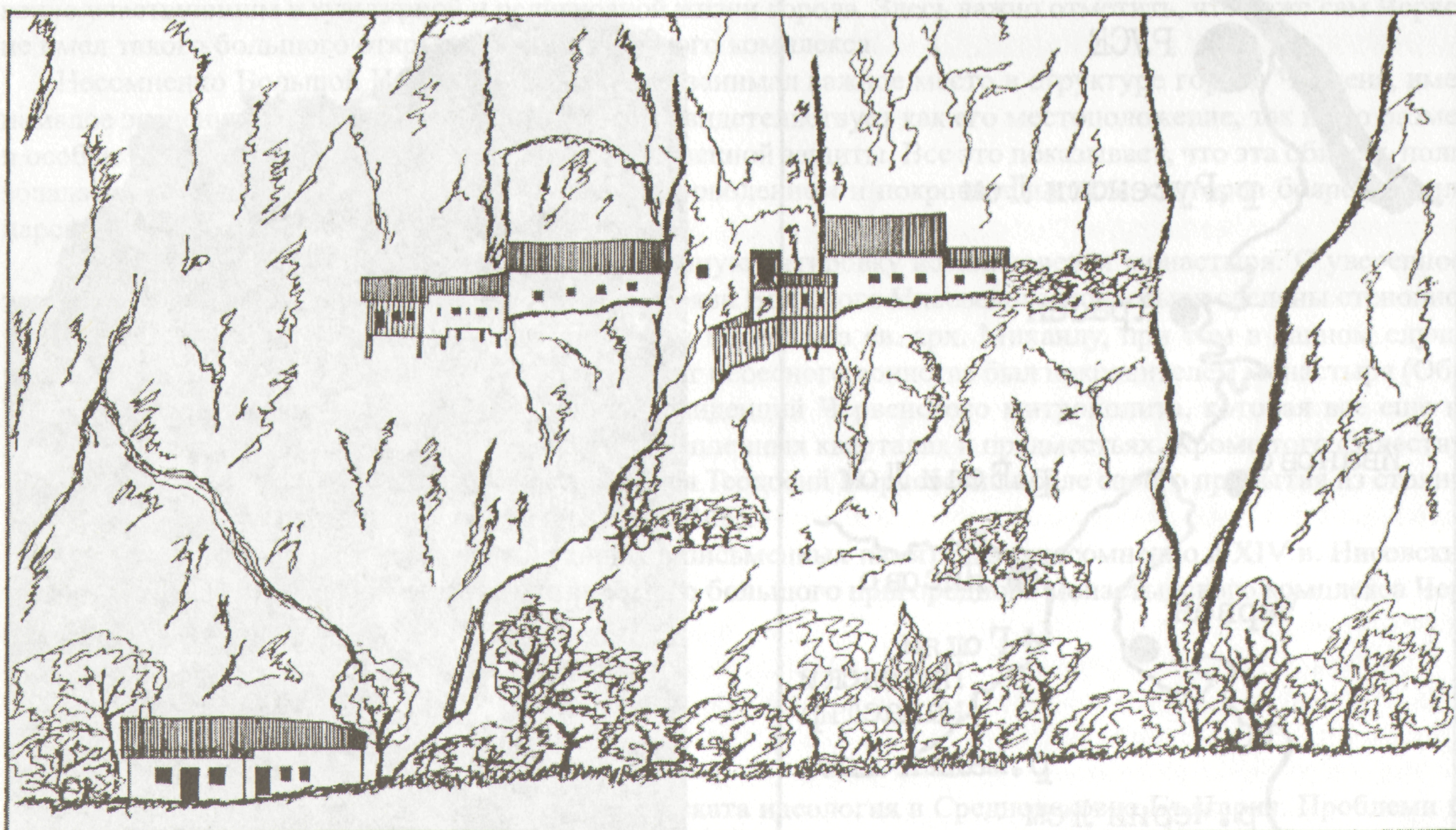
Обр. IV Большой Нисовский монастырь – общий вид с юга.

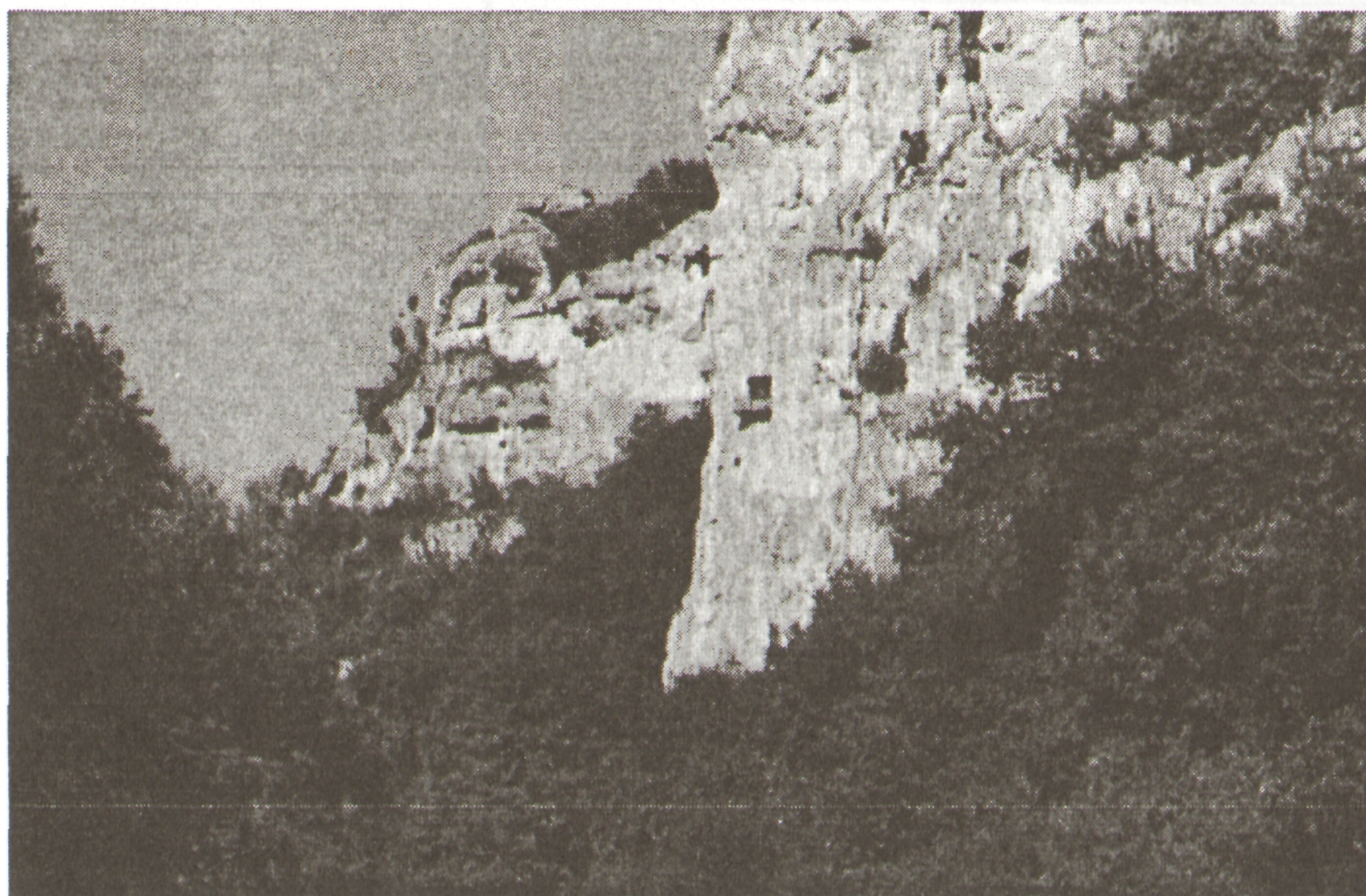




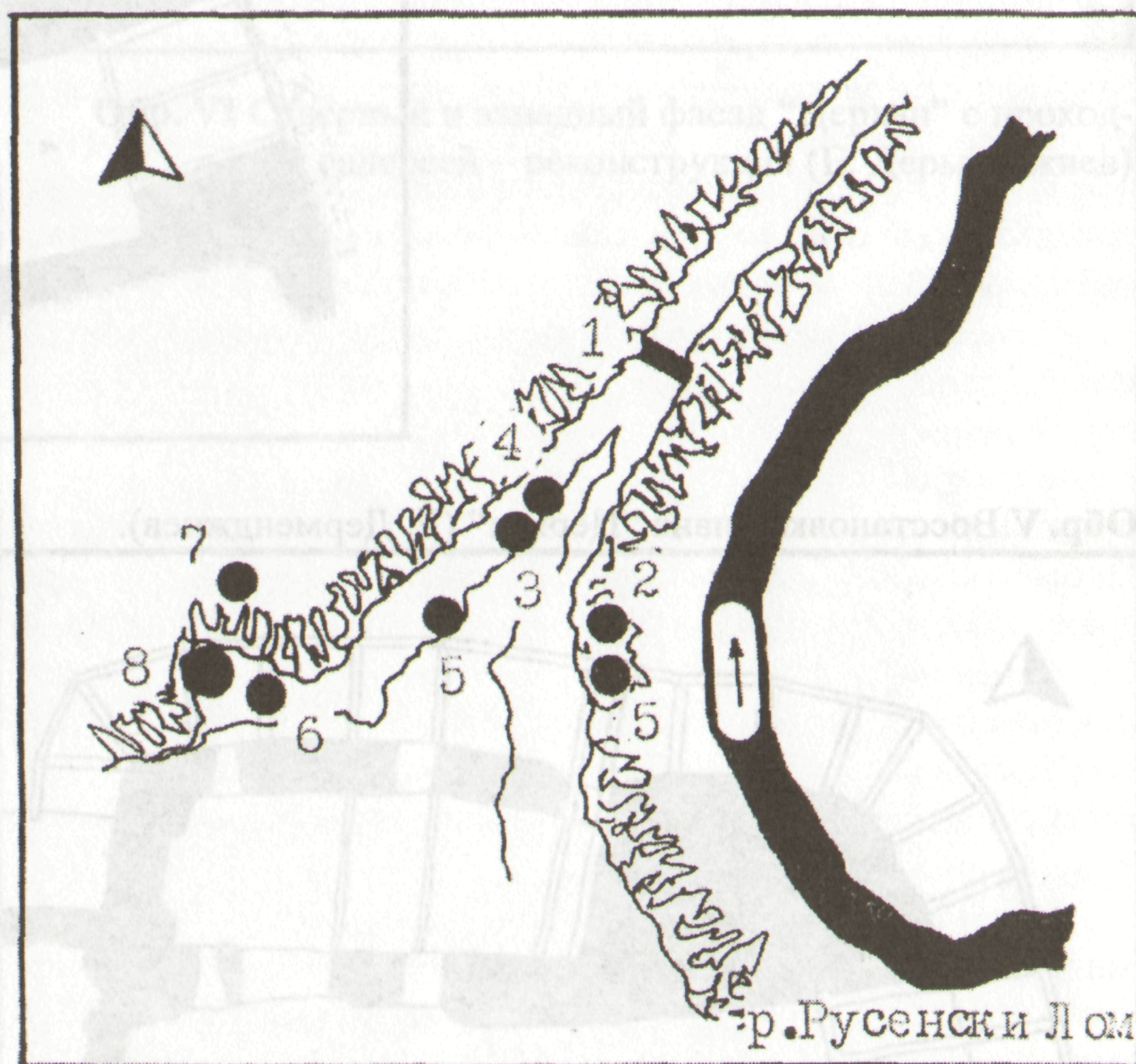
Обр. II План Большого Нисовского монастыря (по К. Шкорпилю).

Обр. III Южный фасад Большого Нисовского монастыря (Е. Дерменджиев).



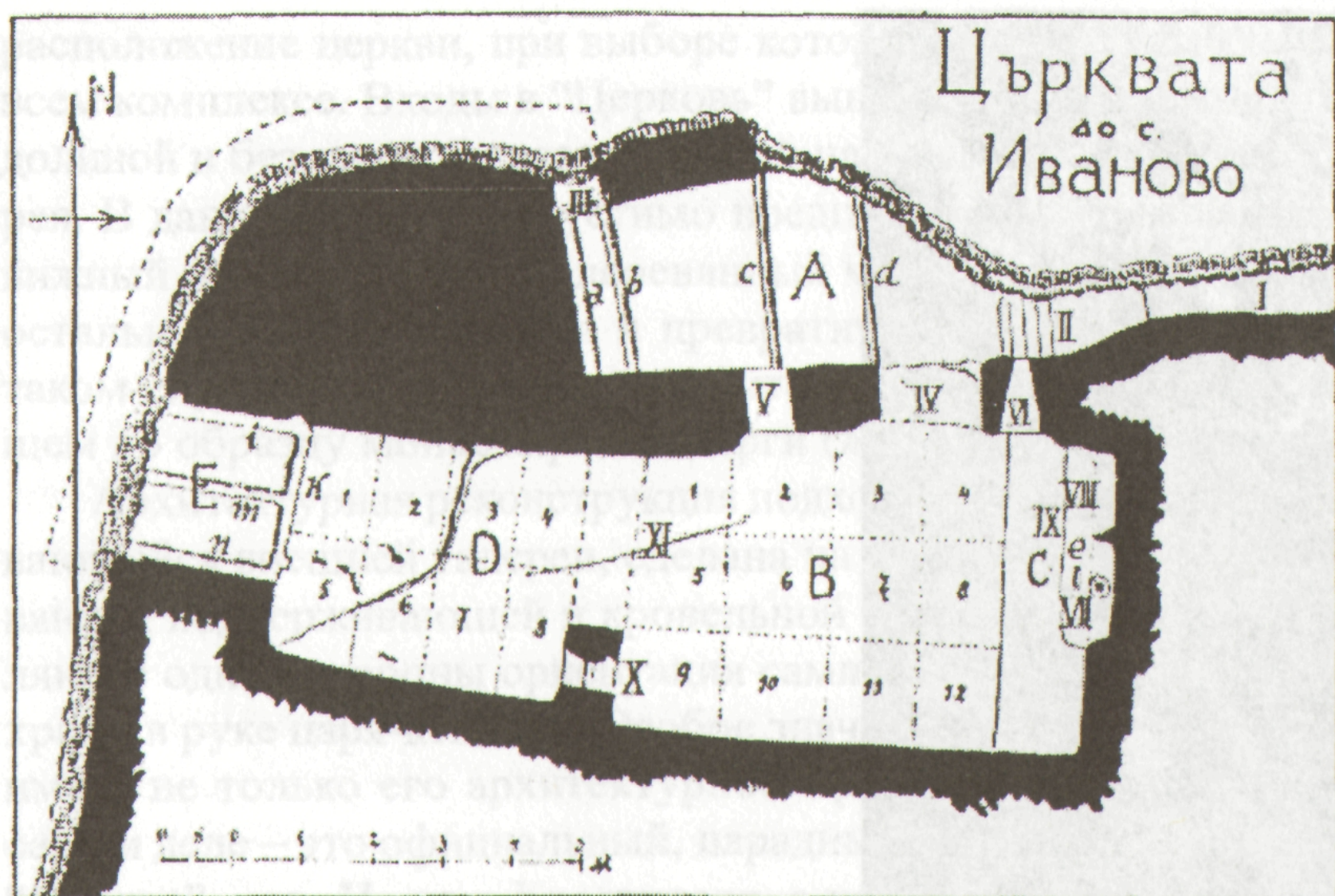


Обр. I "Церковь" — вид с юго-запада.



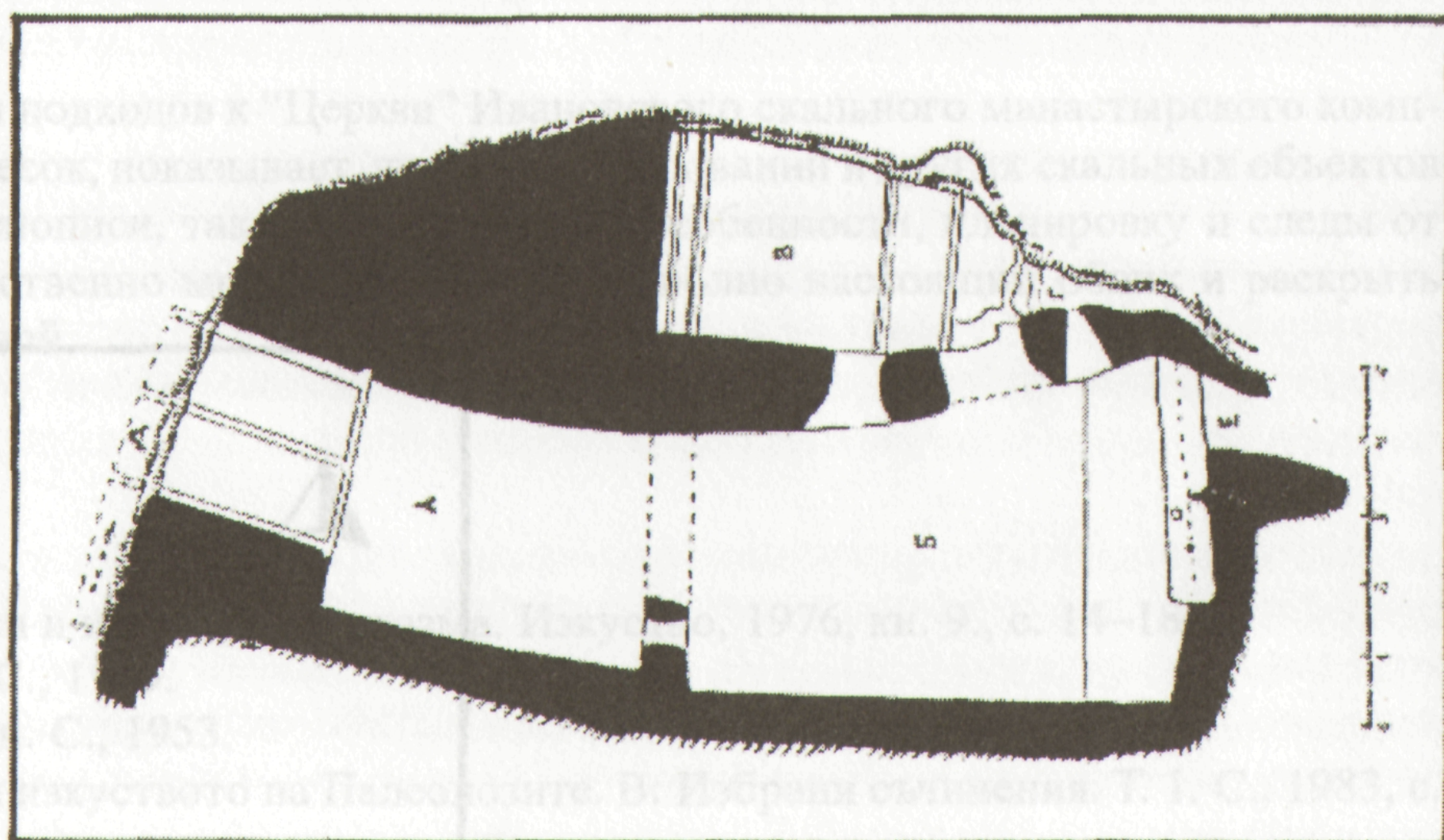
Обр. II План-схема монастыря

1. Ров
2. Параклис
3. Трапезария
4. Магерница
5. Кельи
6. Пещеры
7. Наземные постройки
8. "Церковь"

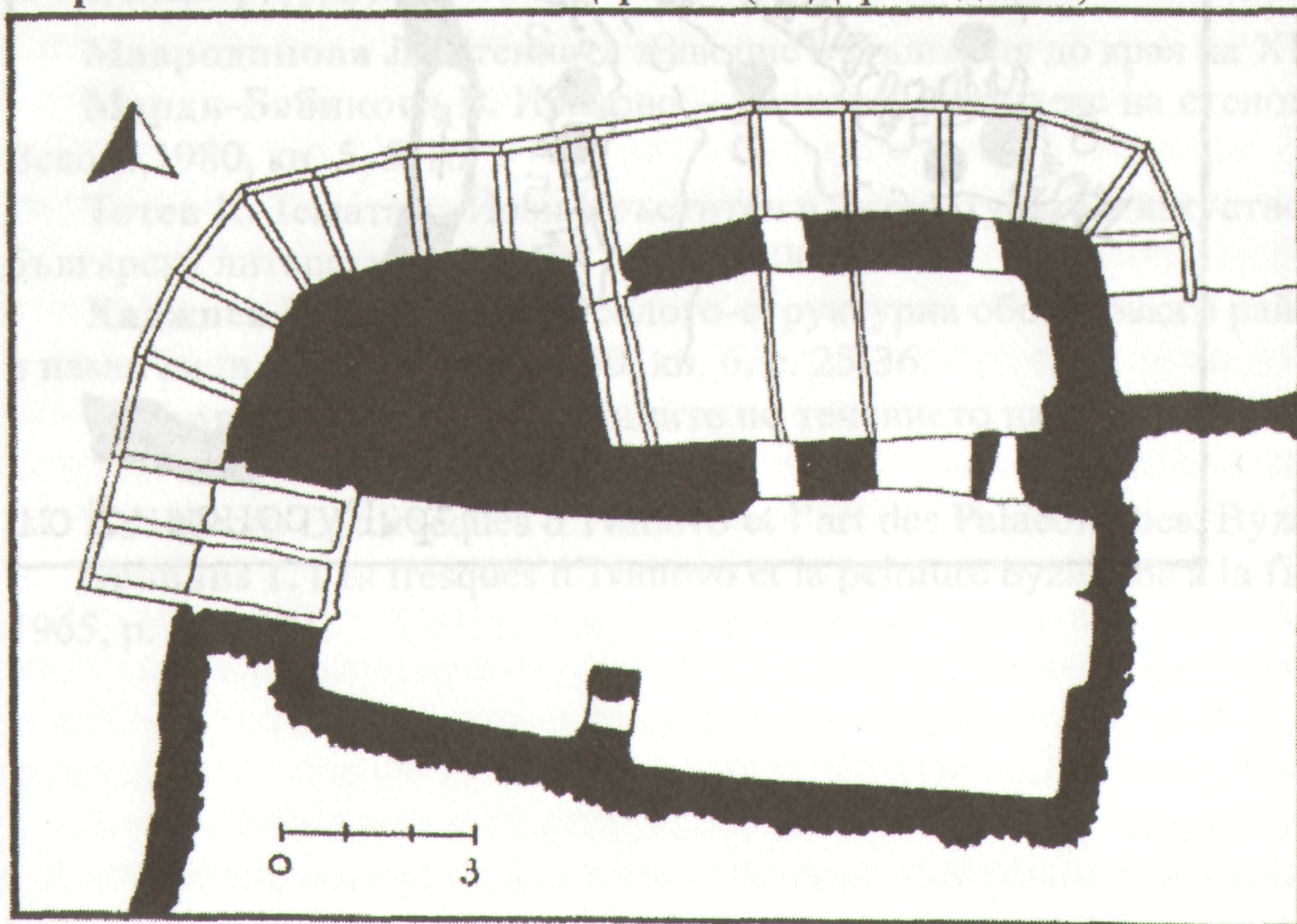


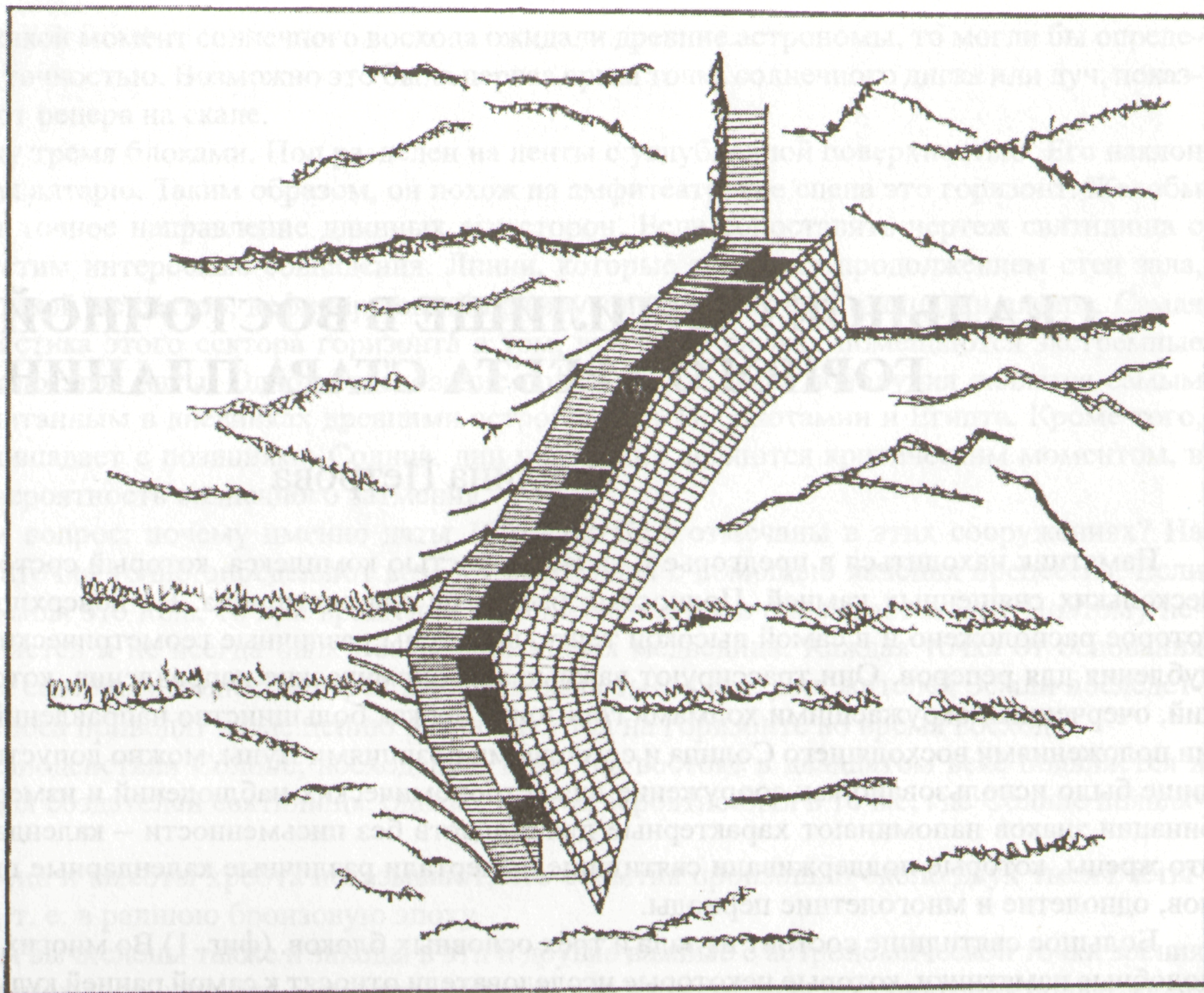
Обр. III План "Церкви" (по К. Шкорпилю)

Обр. IV План "Церкви" (по А. Василиеву)



Обр. V Восстановка плана "Церкви" (Е. Дерменджиев).





Обр. VI Северный и западный фасад “Церкви” с проходной галереей – реконструкция (Е. Дерменджиев)



Обр. VII Царь Иван Александр с макетом “Церкви” – деталь ктиторовской композиции в парадном портале.

THE VENERATION OF STONE AND ROCK IN THE PAGAN (PROTO)BULGARIAN CULTURE

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The Institute of Art Studies
Bulgarian Academy of Sciences

At the beginning of discussing this question it is necessary to make several preliminary remarks.

1. In this period it is preferable to use the nomination (proto)Bulgarians* as equal to the Bulgars, because it is their ethnic and cultural traditions that dominate in the newly created "state"** on the Balkans in A. D. 681.

2. The pagan culture is called the culture of the (proto)Bulgarians on the Balkans before the official adoption of Christianity in A. D. 865. Its "religious" beliefs and ideas are various and sometimes diverse, although scholars tend to seek a systematic expression of the "main state cult" of Tangra (Presoak, O. 1981:), or to discover generic and typologic similarities with the beliefs of the Early Turkic tribes of the First and Second Turkic Khaganates (Овчаров, Д. 1980, No 1; Стойнев, А. 1979).

3. In my opinion it is more correct to speak in general of the pagan views and beliefs of (proto)Bulgarians instead using the term "religious beliefs", although knowing that it does not give proper explanation of the phenomenon. However, the fact that almost at the same time the Bulgars turned to Christianity, the Khazars turned to Judaism and the Turks – to Buddhism seems to point that these views could not be implemented in their already developed state ideology that needed support by another type of hierarchical structure of the views on nature and society.

4. The veneration of stone and rocks goes back to the early history of mankind and his first attempts to become aware of his place in nature. Though appearing quite late in the history of the Balkans and settling down in the 7th c., we can still find in the views and beliefs of the (proto)Bulgarians remnants of earlier traditions that lead back to the place of their origin. However, quite a long time passed from the actual leaving of their home country until their appearance and settling in the Balkans, as being part of different ethnic unions and under domination of the Huns, Turks and the Avars. Then, how they saved all features of their traditions (and among them – veneration of stone and rocks) in these times, in order to see their manifestation on the Balkans in quite similar and nearly equal way to that of the tribes and peoples in the Eurasian steppes and Middle Asia – is still a problem that remains unsolved.

Complexity of the veneration of stone and rocks in the pagan Bulgarian culture is expressed in various ways.

In this paper several manifestations of the veneration of stone and rock will be discussed, i. e. we shall examine the use of stone as object of veneration, and in certain rites: in its natural form, transformed with traces of human interference, further transformed with added signs, images, etc.

We shall try to see certain aspects of the veneration of stone and rock in their relevance and interrelations, trying to point out the possible generic and typological links with similar beliefs and expressions of ritual behavior. The focus of interpretation of such facts is given by M. Eliade's views on history and archetypes, however as facts

*The use of the term is discussed by prof. Iv. Bozhilov in his publication "El nacimiento de la Bulgaria medieval. Problemas metodologicos, terminologicos y tipologicos", *Revista de la Universidad Complutense* (Madrid, 1988): 41-50.

**On the type of the Bulgarian state and the barbaric states in Europe see Hochholzer, H. "Typologie und Dynamik der Voelkerwanderung", *Die Welt der Geschichte*, 19 (1959): 129-145; King, P. D. *Law and Society in the Visigothic Kingdom* (Cambridge, 1972); the granulation style of decoration of the belt fittings found in the grave with a horse burial relates it to Malaja Perescepina find considered as the treasure of Khan Kubrat, the ruler of Magna Bulgaria, Werner, J.

Neues zu Kubrat und Malaja Perescepina. *Germania* 70, 1992, 2 Halbband, 430-436.

of historical manifestations of mental and religious human behavior, trying to go deeper in the meaning and articulation of the phenomena. (Eliade, M., 1991: 33) Here, we shall try to limit our discussion particularly on the restricted base of the written sources about the (proto)Bulgarians and their kintribes in the Eurasian steppes and Middle Asia in the second half of the first millennium A. D. (Early Turks from the First Khaganate A. D. 564-658; Turks of the Second Khaganate – the Blue Turks A. D. 678-746 and the Uighurs A. D. 748-847).

I. The phenomenon of “Devdashlar”

One very interesting phenomenon going back to certain deeply archaic views of the stone is known as “the Devdashlar” (from dev, div, Persian – giant, spirit, tash, Turkish – stone, and the Plural in Turkish). These are stones placed in regular planning, forming one or several square or rectangular configurations. Their presence is basically known for the eastern part of today's Bulgaria, in the regions of Dobrudzha, the eastern Black sea coast and especially around the pagan capital Pliska.

The relation of “Devdashlar” to the phenomenon known as early as the stone age (Stonehenge and the similar manifestations in the Balkans too) and even the late bronze age cultures in Northern Europe, Scandinavia (the ship burials) is a very interesting problem of discussion. The regular orientation of Devdashlar according to the spatial directions and the found there traces of ashes and bones speak that certain rites were performed there. What were these rites?

We do not know what the rites performed around “Devdashlar” were but we can suggest that they perhaps present very ancient archaic ideas of transfiguration of the spirits of the dead in stone: i. e. the stone as a place of inhabitation of the spirit or its embodiment (existing also together with the sacral mythogem of the birth from stone).

According to scholars following K. Skorpil, who first studied them and published his results, “Devdashlar” are attributed to the (proto)Bulgarians. They are interpreted as related to some kind of burial rites. Evidence is attracted from the written sources about the burial rites of the Turkic tribes, where it is said that the Turks placed stones for the number of the enemies who were killed by the dead person (Rashev, R. 1992: 5-31). The so called “ogradki” (from Russian, meaning fences) of the Early Turks in Siberia and the Altai mountain are made of stones and they are found near statues of the dead person (Кубарев, В. Д. 1984; Грач, А. Д., 1961). Such statues are not found near “Devdashlar”, the famous so called “kamennye babi” are found in today's Bulgaria are attributed to the later Turkic tribe from the 11th-12th centuries. Nevertheless, on some of the stones we can see traces of human interference and the stones do exhibit anthropomorphic features.

Other archaeological evidences speak, however of the existence of another type of burial rites in the pagan Bulgarian culture (Въжарова, З., 1981: 43-54). The cemeteries of Kiulevcha, Devnia and others show different burial rites. Perhaps, the concentration of “Devdashlar” around Pliska is a certain proof that they were related only to one group of the Bulgar tribes which kept their Eurasian tradition for a certain period after their settling down in Pliska plain.

II. Madara cult complex

Complexity of the veneration of stone and rocks is manifested most obviously by the so called “pagan cult place” at the rocky plateau near the village of Madara, situated not far from the capital Pliska.

It is quite remarkable that history of Madara cult place leads back to the 4th-3rd millennium B. C or even earlier. Over the ages the rocks at Madara have been continuously used as place of offerings and performances of different cults. The so called “Great cave” was inhabited by stone age peoples whose tools were excavated in 1902–1908 by R. Popov (Мадара, I-II, 1934-1936). His expression “The Bulgarian Troy” refers correctly if not to the function of the site, basically to the existence of different historical layers. We also know that the cave was a nymphaeum after the discovery of a part of votive inscription, besides other finds related to the Thracian culture such votive stone plates of the Thracian rider and Dionisius, a marble relief of the lying Heracles and others.

During the pagan period of Bulgarian culture this place was considered, perhaps, the main cult place of the state. We can distinguish different parts of this, better say, cult complex, which played different functions, and were related to different cults administered in chronological or diachronic periods. It is difficult to find out especially the development of all the parts and their use concurrently or in sequence; although excavations have been carried out for a long time, they are still not enough to give surplus data for its entire explanation and chronology. Yet, the fact that a burial of a very notable warrior is found nearby* shows that it began to be used shortly after the

*In the story of the mission of bishop Israel to the country of the Huns in Northern Dagestan in 682 the Huns are equalized to parts of the Savirs and Barsils. According to М. И. Артамонов in История Хазар Л., 1962, 183-4 and С. Плетнева, Хазары,

foundation of Bulgarian state. And, as we shall see further on, there was a very active presence of (proto)Bulgarians there.

Several written sources can support the interpretation of the place as related to the pagan (proto)Bulgarian views and beliefs.

The most important written source for the history of pagan Bulgarians is the *Responsa Nicolai papae I ad consulta Bulgarorum*. (Decev, D. translation into Bulgarian, 1922) In this document the new converts ask questions about different aspects of the Christian religion, trying to understand whether the new doctrine contradict their habits, rituals and rites. Responsa N LXII says: "*Referring what you mention that before you accepted Christianity, there you had discovered a stone of which if someone, because of unfirmness, takes something, it occurs that he can receive a remedy for his body or sometimes he remains without profit... After you consult us whether to continue making use of it or to give up, we, exerting your tutorship, respond and decide completely to prohibit every taking of this stone...*" Another Responsa, No XXXV says: "*Referring that you are used to, before going out for battle to observe days and hours and to exercise incantations, games, tunes and kind of augury; and you desire to be instructed what to do in such case...*" There are a number of other Responsae such as No LVI speaking of prays for invoking coming of rain, or mentioning rites exerted during daily life, celebrations or warfare, though being not that eloquent as to built up a clear picture of the (proto)Bulgarian beliefs. (Besevliev, V. 1981)

Definitely, the stone, mentioned by Responsa, should be the same one situated near Madara rocks. Although traces show that it had been used, perhaps, since prehistoric times, it is obvious that it played a great role in the beliefs of (proto)Bulgarians. The edifices that were additionally constructed around the stone confirms its sacrality. There is a great controversy about the function of this building: according to G. Feher it was the temple of the forefathers, while R. Rashev considers it a residential building used by the Khan and his nobles. However, the key to its persuasive explanation, perhaps, is the insistence of its relation to the stone, otherwise it would be illogical to built a residential building at such a difficult for construction place, asserted also by the plans of the rooms which does not seem that regular to be used as the ordinary and common space for living. The problems about the function of this building are still to be given a more clear and convincing explanation.

The most important evidence from the written sources about the Early Turks, which is usually attracted for explaining the pagan Bulgarian views, is the abstract from the Chinese chronicle Weichu (Бичурин, Й. 230-231). referring to the Blue Turks. The text denotes several aspects of the Turkic beliefs and rites:... 1) *Entrance of the [Khan's] camp to the East because of benevolence of the sunrise direction; 2) each year together with all the notables the Khan makes sacrifice in the Cave of ancestors; 3) in the middle decade of the fifth moon gathers all and at the river makes sacrifice to the spirit of Heaven; 4) at distance of 500 li west to Dugin there is situated a high mountain on the top of which there are neither trees nor plants; its name is Bodyninli, which means according to the translation: guardian-spirit of the country...*(rem. the translation is from Russian).

How can we relate this evidence to the whole concept of the cult place at the rocks near Madara and its different sites?

Point 1 of the *Weichu* text reminds us of the veneration of Sun. This suggests that the spatial situation of Madara rocks and their orientation in the surroundings had some reasoning for the choice of the place as a sacred one.

The ancestors' cult is accepted to exist in the beliefs of the (proto)Bulgarians, though we are not sure how it was manifested through rituals and rites. Could we relate them to Point 2 from the *Weichu* abstract, referring to offering a sacrifice to the ancestors? It sounds reasonably knowing also that the cave had been previously used nearly with similar function.

Point 3 from the *Weichu* text refers to veneration of the spirit of Heaven at the river. We suggest that a similar way of veneration of Heaven could be exerted also by the pagan Bulgarians, reminding also of the mention in other written source of libations and use of water. (Anastasius Biblothecarius. *Chronographia tripartita*. C. de Boor, Lipsiae, 1885. pp. 338/34-340/20 where he mentions sacrifice performed by Khan Kroum at the sea near the Golden Gates at Constantinople).

If we accept that sacrifices to Heaven were made near the river, how can we interpret the nearby existence of a temple, the so called "kapishte" which is related to Tangra according to all the scholars dealing with this period. That there were temples dedicated to Tangra scholars usually rely on the evidence of Moisei Kagankatvatsi (Мойсей Каганкатвази. История атван. Спб. 1861, с. 193-205) where he speaks of the mission of bishop Israel to the Savirs

М., 1976, 33-34 they are part of the Khazars; according to А. В. Гадлю Этническая история Северного Кавказа IV-X вв. Л., 1979, 152 in the "kingdom of the Huns" the Turkic element was assimilated by the local Alan population of Iranian origin.

(a tribe of Turkic origin) around A. D. 680 in the Caucasus. There it is written that. . . "the Savirs made sacrifice to the fire and venerated several Gods of the way, and also the Moon. In this way, spirits that wanted permanent sacrifices surrounded them. They performed collectively magic games that were wild gestures and battle with swords. The most venerated was Tengri-khan, the giant hero, god of the heaven and light. To whom they devote trees, built kapishte (temple) and sacrifice horses, the blood of which they pour the tree, while his skin and head they hang on a pole. The bishop broke their idols (kumirs) and made cross out of them..." (rem. the translation is from Russian).*

Several (their number is 8) similar temples are found in the capital Pliska, usually under the bases of the newly built churches after the official adoption of Christianity. They have square or rectangular foundations, the inner walls being thicker than the outer. This makes D. Ovcharov to believe that it was the inner walls that was the real structure of the building surrounded by narrow corridors. Perhaps, a Chinese clay model of a temple may give some hints of the kind of this edifice. (Here I should mention also another view of their function and comparison to the Iranian fire temples discussed by St. Vaklinov, 1976). However, I am more inclined to accept the first comparison about the interpretation of the construction as related to Central Asian prototypes. No matter what the original prototype of the plan was, the fact that such pagan temples were found in Pliska shows that their building began later, since we know that the old capital was burnt down by the Byzantine emperor Nicephorus and the stone construction of Pliska actually began in the beginning of the 9th c. This means that perhaps the temples came into use later, together with the strengthening of the cult of Tangra as a "state cult".

Point 4 from the *Weichu* text describing the high sacred mountain of the Turks (without trees and plants – Sic!) is supported by other sources giving nearly the same evidence. In his description of the diplomatic mission of Byzantine high court official Zemarkhos to the ruler of the Turks Silzavul in A. D. 568 [*Exc. de legationibus*, 152-154] Menander describes that the place of the Turkic Khagan was situated in the Golden mountain "Ektag". The golden mountain as the center of the Turkic union is also mentioned by Theophylact Simocatta in his *History*. The name of the Altai mountain, the place of origin of the Turkic tribes is considered as bearing the meaning of golden mountain (Потапов, Л. П., L. P. 1946).

Here, I would like to emphasize on the Central Asian roots of these sacred ideas of the Early Turks by attracting another comparison with a similar symbolic place in the Chinese culture. Mount Tai is the best known among the five famous Buddhist mountains in China. Also called Mount Dai or Mount Daizong in ancient times, Mount Tai is located on the wide Tailai Plain of central Shandong Province. Yuhuangding (pink of the Jade Emperor), north of the city of Tai'an, is its highest peak, rising to 1,545 meters. Ancient emperors prayed for the country's prosperity and peace by offering sacrifices to Heaven and Earth on Mount Tai. According to historical records the Western Zhou Dynasty (256 B. C.), 72 monarchs came to the mountain to perform sacrifices. Later they were followed by Qinshihuang, China's first emperor, emperors Wu, Guangwu, Zhang and An of the Han Dynasty, Gaozong and Xuanzong of the Tang Dynasty, Zhenzong of the Song Dynasty and Kangxi and Qianlong of the Qing Dynasty. (For the cult of the Mountain and the cult of the stone see Яншина, Э. М. 1984: 35-38).

Obviously, the whole concept of the place of Madara and its sacralization is related to symbolism of the Cosmic Mountain. This concept is well known in different cultures, being expressed in visual and other signs, and though we do not have written sources directly mentioning it as being typical for the (proto)Bulgarians, we are right to conclude that such ideas did exist among the (proto)Bulgarians. And perhaps, this above mentioned comparison with the Chinese culture may give further ideas for interpretation of the reasons for the choice of the place at the rocks as the main cult place, and also for the execution of the relief on the rocks *together with the inscriptions*.

Then, how can we link all these parts of the cult complex with the stone relief of the horseman on the rocks?

The different interpretations of the meaning of the relief have both their contradicting and logical sides.

The first one discusses Madara cult complex as a commemorative monument of khan Asparukh associated also with the cult of the forefathers (Фехер, Г. 1932; Фехер, Г. 1934). It has reasonable sides and disadvantages. If we compare Madara with the memorial complexes of the Early Turks we can find similar points. The construction of the complexes usually includes a plan with a main building, sacred route marked with statues of human and animal

* This arises several questions (to mention only two of them) for discussion about the views of the pagan Bulgarians which are still not so profoundly discussed in literature.

1. What is the relation between the official cult of Tangra and the shamanic views. From later ethnographic sources about the Turkic population in Siberia it is mentioned that it was forbidden for the shamans to come to the performances where a sacrifice to Tangra was being made. (Iakovlev, E. K. 1900)

2. Did the imposition of Tangra cult forbid or prevented from practicing the other cults, mentioned above as being exercised in the other sites of the cult complex of Madara rocks, or they run concurrently and simultaneously.

figures and the figures of the commemorated person (for example the memorial temple of Kiul Tekin (A. D. 732), (Новгородова, Е. А. 1981). Such concepts of organization of the space of the memorial we can find also in the Chinese culture. The similar points are the commemorative inscriptions (we shall discuss them further on) and the presence of an image, however, as we see in the Turkic monuments, it is the organization of the space by means of a main, sacred route with statues and a temple that is the central idea of the commemorative complexes.

It is difficult also to accept the relief as the image of Tangra knowing that this god (and was it actually a god?) has never been given a visual image even among the Turks in later times. * (Here I will not deal with the features of Tangra and his cult; in Bulgarian written sources it is mentioned only once in the form of Taggra in a Greek inscription, however, coming from the same place Madara! (For the cult of Tangra among the Turks see Roux, J. - P. 1959, 231-241; 1962, No1, 1-24 and No2, 199-231; 1956, No1, 49-82 and No2, 197-230; 1957, No1, 27-54 and No2, 173-212; Thomsen, V. 1896, vol. 5)

The third idea – that of the relief being a representation of a certain Bulgarian ruler, either Asparukh or Tervel, (the latter suggestion seems to achieve more weight) also has its counterpoints. The basic parallel for such interpretation is given by the so called Sasanian reliefs (for example the investiture of Ardashir I (224-241) at Naqsh-e Rostam, the triumph of Shapur I (242-272) – the so called Roman victory; the triumph scene of Khusrau II Parvis (591-628), etc. And it is true, we can find a number of evidence supporting the influence of Sasanian ideology over the peoples living in the periphery of their Empire, however neither such concepts of the relation between god and ruler existed among the proto(Bulgarians) nor this “ruler portraying” tradition, (if the appearance of the relief in Madara portraying a certain ruler was the first act of this tradition), was continued during the ages as it is the case with the Iranian relief tradition.

The last idea – the relief being representation of a certain unknown hero-rider, a certain mytho-poetical figure with whom every ruler could identify himself seems now to gain more strength (Минаева, О. 1991).

No matter how we accept the function and the meaning of the relief, its symbolism has to be related to the idea of the image as a transmitter between Heaven and Earth, in the center of the axis mundi, implying in itself the “condensed time” of past, present and future. And it is because of this symbolism that Madara rocks even today are still a place for veneration for the local population (a question discussed by the folklore and ethnology studies).

III. The (proto)Bulgarian inscriptions

Another aspect of the sacred views of stone and rocks could be found in the use of stone columns for the official inscriptions (Besevliev). They served as official documents of the Bulgarian pagan court, a tradition that again leads to Central Asia. Again we can seek parallels not only in the Early Turkic examples (the stone plates with runic inscriptions, for example the plate with inscriptions of Kiul Tekin, A. D. 732), but also in Chinese ones (the stone poles and the stone plates with inscriptions). And again we can detect in the core of the use of stone as carrier of signs and inscriptions its deep sacrality and relation with very archaic ideas in the mind of the people.

To this tradition, particularly, it can also be attributed the so called runic signs and tamgas on stone blocks, bricks and other material.

One of the predominant signs or “tamgas” during that period was the so called “y” with two hyphens’. (Пашев, Р. 1992, vol. I, p. 96; Георгиев, П. 1996: 89-100). On the one hand it is interpreted as a sign, marking the building material such as bricks, stone blocks and ceramic tiles. However, another opinion emphasizes on its interpretation as the sign of Tangra, or as the magic clan-tamga of Doulo (Vaklinov, S. 1978; Атанасов, Г. 1993: 163-171; Бешевлиев, В. 9 (24), 1973: 53-62.), or even scholars find similarity with the Chinese sign “shan” for the sacred mountain.

IV. The drawings-graffiti

Topography of the graffiti – they are spread basically in early Medieval settlements and cult places, and particularly Pliska and Preslav (Михайлов 1947: 226-228; Станчев 1955; Овчаров 1982; Пашев 1, 1990: 49-55), also show their relation to the early culture of the pagan Bulgarians, though graffiti are present also in the later Medieval period. Most generally, they appear between the 8th-11th cc, and those from the 9th-10th c. (dated and defined according to the obvious mingling of pagan and Christian signs and images) are more numerous.

The pagan Bulgarian graffiti are similar to such graffiti in the area of Saltovo-Maiaki Culture (Плетнева 1984: 57-94), to those from the areas East of the Caspian sea (Western Turkmenistan and Kazakhstan), Central Asia, Siberia and the Altai mountain (Поляков 1973).

This specific phenomenon of graffiti is characteristic of different areas and cultures rooted in the archaic magic symbolism of prehistory. Similar symbolism we can also seek referring to the Bulgarian drawings, although they

are classified as belonging to the lower level of culture, or as expression of unprofessional impulses and activities. However, the place of the graffiti in the Eurasian tradition, usually on stone columns, stones, rocks near the river, is not without significance. In the same way we can view the place of the pagan Bulgarian graffiti as sacred, because their function as signs were also to mark this space or the object (Фехер 1934: 14; Дончева-Петкова 1980; Аладжов 1989).

Here I will emphasize on one typological similarity of the pagan Bulgarian drawings, especially with these from the Scandinavian Viking period. Although they come from a period later than that of the Bulgarian drawings I would like to stress on the similarity of the ideological concept of their presence, besides the "outer" similarity of their execution in stone. Most of the drawings represent the same subject of the rider, besides, what is most important, the inscriptions that accompany them are seem to be the same as one certain type of (proto)Bulgarian inscriptions. The Viking inscriptions usually give the name of the person, its clan, his deeds and the place where he fell in the battle as some of the most commonly spread (proto)Bulgarian inscriptions.

Conclusion

From the discussed peculiarities of the use of stone as object of veneration or related to different beliefs and ideas in the pagan Bulgarian culture there arises one question – from where and how such kind of feeling, knowledge of work in stone and ability to create two- and three dimensional images sprang, since the other found remnants of the culture of (proto)Bulgarians show that their art in the previous centuries before the settling down in the Balkans was noniconical, nonfigurative and basically ornamental.

The answer is in the deep relation of one branch of the (proto)Bulgarians on the Balkans, that kept its Eastern Central Asian and Turkic traditions. It was obviously a part of the ruling circle, since they shape the predominant features of the pagan Bulgarian culture.

At the end, I would like to make one conclusion. Judging by the prestige and large distribution of metal (gold and silver) works in culture of the Migration peoples and the (proto)Bulgarians among them, the prevailing view about the main character of this culture is that it is "a metal culture" and "a culture of the minor objects". Now it is time to review this statement and discuss the culture of the pagan Bulgarians in terms of a "stone culture". The diversities and peculiarities of its manifestation deserve to be in the focus of our studies and expect their clarification.

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ΠΕΤΡΩΜΑ

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Πέτρωμα (ατος, τὸ) means “mass of stones”. It is almost a hapax in ancient Greek. In **Eurip. Orestes** 50, 442 Murray it is used in the expression “to die (to be killed) by stoning”. The second and the last passage comes out from Pausanians’ description of the sanctuary of Demeter at Pheneòs in Arcadia (near pres. Phonía), a town surrounded by mountains, mentioned by **Hom. Il.** 2. 605 Monroe–Allen and situated in Peloponnesian region. It has not been damaged by the Dorian invasion. The inhabitants of this region are a cypro-arcadian, i. e. the oldest Greek dialect speaking people.

The text of **Paus.** 8. 15. 1–4 Rocha-Pereira reports that the Pheneáts have a *hierón* of Demeter named *Eulisinia*, because of the mysterial initiation, which is the same as *Eleusis’ Drômena*. The reason of that is due to Naòs, great grand-son of Eumolpus (the Thracian mytho-founder of the Eleusinian mysteries), who came in Pheneós by prophecy of Delphi.

At the Demeter’s *hierón*, Πέτρωμα has been made by two big stones put together facing one another. During the so called great mystery the Pheneáts every year open the stones, says Pausanias, take away from inside γράμματα concerning the mysterial initiation, read them aloud to the mysthes and in the same night put them into again. The Pheneáts take the oaths of higher importance before Πέτρωμα. A rounded lid is set up the stones, and keeps under itself the πρόσωπον of Demeter Kidaría – an arcadian identification of the Great Goddess Mother celebrated as thiara/diadem crowned divinity with κίδαρις, which is the name of Arcadian ritual dance, too.¹

The priest puts on himself the πρόσδον in course of the greater mystery and wisely (κατὰ λόγον) beats the hypochtonian (gods) with rods.

The Pheneáts have their λόγος on Demeter, who wandered about before the arrival of Naós. Those who welcomed the goddess at home and with hospitality, she endowed with all pulses except bean. There is a sacral λόγος on the reason why the bean is not clean. Pausanias adds that two men, Trisáules and Damitháles built up a temple at Kylléne mountain, near by Pheneós, dedicated to Demeter Thesmía, the law founder, where they established her mysteries performed up to Pausanias’ time.

My comment will be summarized in the following points.

1. The land of Arcadia and especially its northern parts where Pheneós lies on a field isolated by mountains, is a typical pre-classical ethnos community. It has been hellenized very early in Mycenaean times, but its Bronze Age oral culture was not disturbed during the I mill. BC.

2. This drômena (ritualistic) tradition of oral faith enters a very long-term existence until the Roman imperial period in order to prove the living antiquity of the ethnos structure in front of the polis-state, as well as of the Roman provincial administration and culture.

3. The living oral antiquity is clearly explained by the Eleusis’ mysterial drômena, i. e. by the Thracian orphic faith, personified by Eumolpus–Naós, and according to Delphi’s prophecy. Delphi is a key-term here, because of its pre-greek megalithic Thraco-Pelasgian origin.²

4. Πέτρωμα is a typical rock sanctuary for orphic initiations in the faith of the Great Goddess Mother. In its rocky-mountain variant this faith is concentrated into a cut-down sacral womb with upper opening closed by stone lid.³

5. The γράμματα or the sacred λόγος corresponds exactly to the *Orphic tablets* mentioned by some ancient authors and containing φάρμακα, i. e. spiritual healing for initiated. These phármaka could be read in Greek version on the orphic gold tablets found in burials. They contain hidden codes of the way to the immortality.⁴ The oaths of the believers before Πέτρωμα confirm this character of the initiation.

6. The Great Goddess Mother is identified of course as Demeter, but she has some features of Thraco-Phrygian megalithic Cybele (the Kídaris-crown and Kídaris-dance). They reflect the oldest image of the goddess and her initiational function.⁵

7. This is to be seen in the function of the *prósôpon* (=mask) of the goddess. Protected by the lid in the stone womb, the *prósôpon* changes the priest into substance of the goddess, i. e. into her son-servant, who becomes at this moment her *parédros*.⁶ He obtains equal position with the goddess and revives the chthonian deities by the rod in order to construct the solar-chtonic cosmos.

8. The *lógos* of the wandering Demeter is a brilliant metaphor of the situation before and after the founding of the mysterial *drômena*-faith. This time-border is explained once again by the bean. It is a prohibited food for the Orphists-abstainers because of their belief that the beans bring back the souls in Hades, i. e. to the death.⁷

I would like to underline some more general and methodological problems at the end of this comment on Pausanias' text on the basis of the already made conclusions. That the rock-cut and megalithic monuments could be situated in the history of the oral culture on the territory of the Thraco-Phrygian contact zone (South-Eastern Europe – North-Western Asia Minor) with the support of the *drômena*/ritualistic explanations. The old view-point of the so called anonymous "rocky beliefs" goes back to impasse. The rites are Orphic mysterial and this feature proves the theory of the oral orphism. It is named *Thracian* by reasons of concentrated in Thracian area different kinds of sources revealing typical *ethnos* social structure and not by "ethno-genetic" reasons.⁸

1. Thanks to studies made after a long time mission during the years 70th and 80th of the 20th century in the Eastern Rhodopes, Strandzha and Sakar Mountains and partly in the Eastern Haemus range, and especially thanks to the full revision of the published monuments made in 90th, it will be senseless to take over the research of the Bronze Age South-East European Megaliths only by traditional archaeological methods, well known from publications on such a kind of monuments in Euro-Asia.

The rock-cut and megalithic monuments in Euro-Asia are situated by areas with strictly differentiated cultural features. It will be out of time to compare the dolmens in Bretagne-France to those in Sakar. The area of Thracian rock-cut and megalithic patterns is to be included into the western region of the ancient Thraco-Phrygian ethno-cultural contact zone (pres. Bulgaria, Turkey, Greece) during the 3rd -1st millennium BC. As already said – between "Midas" Gardens in Europe and Midas' city in Asia Minor.⁹

2. The monuments in the contact zone have to be seen not as isolated examples of the classification scheming – niches, basins, altars, dolmens, menhirs, so called thrones, solar disks, caves, rock sanctuaries, tombs, rock stairs, etc. – but, if possible, as complexes. The functioning of the particular structures/subcenters of the complex could be understood only as interaction of the intentions put into them, i. e. as a system thought by its bearers.

3. The system of connected functions is ritualistic, in other words, it designates the rite and the ritual. The rite or the essential expression of the oral faith consists in forms of a fulfilled procedure, which is the ritual itself. If the rite in oral antiquity is for ever a kind of initiation or of initiational mystery, realized by the vision of the divinity, the ritual has to include preliminary purifications, obtaining of sacral artifacts-mediators, prayers, dances, offerings, sacrifices, oaths, real or symbolic burials, etc.¹⁰

4. The early ritualism of the non-literary ethno-cultural communities in the Thraco-Phrygian contact zone (3rd -mid 1st millennium BC) does cover many definitely established results by synchronic or diachronic studies: *synchronic* – at the level of simultaneously dated evidences as, for instance, ceramic fragments or Phrygian rock inscriptions and those found in Thrace as well; *diachronic* – at the level of clearly preserved Bronze Age traditions during the Classical Times and even later as, for instance, Mycenaean *koinê* *ethos*' practices and their living antiquity in Roman and Medieval epochs up to our days.

5. The oral megalithic ritualism could be approximately explained my means of the structural-functionalistic approach on the base of archaeology, epigraphy, written Greek/Latin sources, art history, mythography, ethnology, folkloristic and linguistic studies. So, the complex of Perperek in the Eastern Rhodopes, for instance, offers the perspective of a multi-composed topos, because, firstly, of the toponym. It cannot be interpreted neither by Bulgarian, nor by Turkish or Greek languages/dialects, but by Thracian *Per-* in its typical doubled form *Per-Per*, meaning "stone, rock, rocky peak, high rocky mountain".¹¹ This form creates the names of Thracian kings-priests-anthropodaimons-gods. Being the designation of this series of personifications, *Per-Per-ek* becomes the center of a clear megalithic traditional topos, which expects to be explored as such within the frames of the splendid archaeological and ethnological landscapes.

6. The mega-complexes, according to the revision mentioned above, are conceived as *Topoi* of Faith. Some of them as Sborjanovo-Demir Babba Teke near Ispcrih, North-Eastern Bulgaria, or Krastova Gora with Enihan Pasha sanctuary in the Central Rhodopes, are ancient sacral places of Thracian, Old Bulgarian, Christian and Islamic

cults. Now they represent tolerant cross-points of pagan beliefs, Christianity and Islam.

7. The Topoi of Faith conceived as Long-Term culture-historical sites have their doctrinal origin. They are not accidentally chosen, because of the availability of big stones and rocky terrain. The mega-complexes represent the spiritual structures of the interactions between the four Cosmic Elements and of their anthropo-visions going to cosmogonic, theogonic and mystery-initiational norms of convictions and human attitude. This system of norms, known on the territory of the Thraco-Phrygian contact zone in South-Eastern Europe and Western – North-Western Asia Minor, forms the doctrine of the oral Thracian Orphism.

8. If the oral Thracian Orphism rises up from the general East Mediterranean faith-rite tendencies of the 3rd-2nd millennium BC and especially under Egyptian theological influence, it will be necessary to bring together, so to say, the Earth and the Heaven.

It is not enough, as the astronomers have made on Tatoul megacomplex near Momchilgrad in Southern Rhodopes or on other sites, to prove that the rocky grooves are there oriented to the vernal/autumnal equinoxes (about 20-22 March and 20-22 September) or that some of them have been observatories, as usually said.

The problem is what has been observed.¹² Firstly the doctrinal Orphic 8-year cycle of self perfection, identified with the birth of the son-king-teacher born by sacred marriage between the Great Goddess Mother (the Earth) and her Son (Sun-Fire). This 8-year cycle corresponding to the degrees of The Orphic Faith in immortality could be observed from some peak-sanctuaries when the Earth, the Sun and the moon come to closest approach. Thus, the celestial way crosses itself with the terrestrial.

Secondly, the Topoi of Faith – the megacomplexes – are surely oriented mainly to the Milky Way, to the constellation of Orion, the legendary Hunter, and to Sirius. The ground orientation reflects the disposition of the stars in the period of the building-up of the monuments, i. e. not later than mid 2nd millennium BC. This investigation requires computer imitation of the Orphic Heaven at least 3500 years ago and the virtualization of the doctrinal reality. The virtual image could be involved into the vision of the believers calling the Orphic immortality through the Sacred Marriage. The Earth is Sirius, and her Son, the Sun-Fire – Orion. They are, at the same time, down below in the rock-sanctuary and up, on the celestial temple.

NOTES

¹ Κάδαρις = Cyr. κίτταρις according to **Hesych.** s. v. Latte (A-O) what is a good evidence of the ancient dialect. As Arcadian dance s. **Athen.** 14. 631d Kaibel, but Pheneòs is not there explicitly mentioned.

² Fol 1986: 150-165.

³ Fol V. 1993: 18-27.

⁴ For the Orphic tablets s. Zuntz 1971: B3-B8; A1-A5; Zuntz 1976; Graf 1990 and 1991 with sources and bibliography. Last analysis by Fol 2000.

⁵ S. Borgeaud 1996.

⁶ For the masks in the Orphic ritualism s. Fol V. 1997, Фол В. 1998 and 1999.

⁷ Cf. the comment of West 1983: 14-15.

⁸ Cf. Fol 2000 passim for the classificatory function of the term "Thracian Orphism" in order to express the most relevant area and source material concerning the oral doctrinal faith in immortality.

⁹ The summary and the terminology in Fol 1997.

¹⁰ Fol V. 1993 and 1998.

¹¹ Цымбурский 1996.

¹² Blomberg-Heuriksson 1993 for Petsophas in Crete with written sources.

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ARCHITECTURE OF ROCK-CUT MONASTERIES IN GAREJI, GEORGIA

Lado Mirianashvili

Georgia is one of the most ancient Christian countries. Andrew the Apostle was the first to bring the Christian faith to southern provinces of Georgia in the 1st century. Apostle Simon of Cana preached farther to the north near Sebastopolis, ancient Georgian town by Black Sea shore. Part of the population living throughout the area was converted to Christianity. The solid basis had been prepared for spreading new faith, moreover precondition already existed: the mantle of Eliah the Prophet and the Lord's tunic were kept in Georgia. St. Nino Cappadocian was to bring the Christian faith to eastern Georgia in the 4th century by direct inspiration from the Mother of God. Christianity was announced state religion in 337 thanks to her efforts. In the end of the 5th century, in the epoch of political and cultural upheaval of the country, during the reign of King Vakhtang Gorgasali Georgian Church gained independence. The first monastery in Georgia founded in the 5th century paved the way for promotion of monastic activity in the country. The "Twelve Syrian Fathers" were of notable importance in this process. They came to Georgia in 532-537 (Merkviladze 1996: 24) in order to strengthen the Christian faith in the country. One of the Fathers was St. David who established the monastic system throughout the region of Gareji Ridges, semi-arid steppe zone. His followers expanded borders of the monastic "state" far beyond the region of Gareji Ridges as far as Iori valley. The monastery now known as Laura of St. David and two others: Dodorka and Natlismtsemeli (monastery of St. John the Baptist) were founded in time of St. David.

St. David and his disciple St. Lukiane according to the "Vitae of St. David" (Vitae, 230) lived in natural caves, now found in the lower court of the Laura of St. David. The cave of St. David is preserved quite well. This natural cave is very small with maximum dimensions of some 1.8 m in width, 1.4 m in depth and 1.6 m in high. One can see that the only adaptation it had undergone is a rock-cut bed along one of the walls. St. David worked several miracles after establishing himself in the desert, and he found the fame of a sacred person. People flocked to St. David from remote villages, and he granted them permission to rock-cut cells in vicinity of his cave (Vitae: 234). This information from the Vitae gives us evidence that each monk had to rock-cut his own cell. Probably some of the first cells were natural caves that have undergone minor changes. Cells and churches were rock-cut in sandstone and in rare cases in conglomerate stratum. Rock cutters began by digging from the entrance into the rock, and after reaching the imaginary centre of a cell, carved out the stratum evenly in all directions. As a result elliptic cell was rock-cut. At an early stage of the monastic life monks did not finish the roughly carved space and left as it was.

Little is left from these primitive cells as they have undergone reconstruction mainly since the 9th c. when the ascetic style of life was mitigated in Gareji (Mirianashvili 1997: 51). Small and uncomfortable cells of irregular design were enlarged and shaped like the stone constructions with flat walls and certain elements of decoration: niches, lunettes and even wall paintings, especially during the Late Middle Ages. If a Father Superior's cell at an initial stage did not differ from the ones belonging to other monks, lately they were rock-cut at the most distinguished location – by the main church. In the 12th-13th cc. the praying niche in a Father Superior's cell was decorated with fresco (e. g. in Bertubani monastery).

Pickaxe was the typical instrument for rock cutting. The instrument was identified by the traces left by its sharp points on the rock, as well as thanks to the fresco depicting a monk working with a pickaxe. The image is preserved on one of the walls of a cave in Natlismtsemeli monastery. Walls of the caves were left bare only before the 9th c.

They were not polished, displaying traces left by pickaxe points. Later on walls as a rule were plastered.

The layout of caves in Laura of St. David had unsystematic character unlike Palestine monasteries, where cells were rock-cut around the mother church. At an early stage Laura of St. David, being an anchorite structure, lacked

communal church and the monks prayed in private prayer chapels (oratories). The very first communal church in Laura – Church of Transfiguration was rock-cut by Bubakar, a nobleman who was the first individual baptized in Gareji: “And he brought digging instruments and laborers and created a church for the brotherhood for praying” (Vitae: 237). From the above information we can judge that large communal churches were used to be rock-cut by skilled builders. One noteworthy feature of the main church in monasteries of Gareji is that they repeat arrangement of the Church of Transfiguration in Laura of St. David: to the north of the nave in each case is a smaller and lower chapel linked to the main church (Fig. 1, 2). We suppose that the above regulation took effect since the 9th c. on, after St. Hillarion Kartveli enlarged the Church of Transfiguration, the burial place of three Saints: St. David, St. Lukiane and St. Dodo. The relics of St. Dodo were transferred to the above church in the 19th c.

Architectural design of Gareji churches is unique. The structures are quite different from those in Cappadocia: quest of design in a process of carving was characteristic (as a rule) of Gareji, when the design of stone constructions was blindly imitated in Cappadocian rock-cut churches.

Churches in Gareji are single apse caves with the apse facing east. At an early stage apses were horseshoe shaped. A rectangular rock altar stood within the apse. In early middle ages altar stood against the apse wall. Later on, it was moved from it. Other three walls were decorated with niches or blind arcades. At an early stage interior design was free: without strict rectangular forms. Even the walls were uneven: sandstone strata has inclusions which made difficult to smooth the surface. Some of the inclusions were plastered as they were, others were shaped like medallion (Chichkhrituri monastery). Anyway, irregularities of interior were treated quite creatively resulting in an individual, nonstandard design.

Apart from the barrel-vaulted hall churches, the domed ones can be found in certain monasteries of Gareji. Quest of the dome shapes in Georgia was launched in the 2nd half of the 5th c. simultaneously with Byzantium and independently from it. Domed structure unlike basilica was closer to Georgian architects as the crowned dwelling hall – “darbazi” was widespread in Georgia since ancient times. Basilica of St. Marine of Zegani in Georgia, which dates to the 5th c. has the blind cupola. Design of a dome in the Georgian architecture was finally formed during the times of upheaval of the church architecture in the 6th-7th cc. Church of Jvari in Mtskheta (586/87-604/605) can be mentioned as an outstanding example. In spite of the above fact, architects of Gareji in 8th-9th cc. worked hard on the cupola design. The quest has resulted in variety of shapes: sphere, cone (Fig. 3), truncated cone (Fig. 4), pyramid. The most unique design of a dome was found in one of the churches of Mravaltskaro monastery (8th-9th cc.) discovered in Gareji by Fund “Udabno” expedition in 1995 (Jojua, Mirianashvili 1996: 42): this is a sequence of three cylinders, diameters of which diminish with height (Fig. 5). Heights of the cylinders diminish in the same way (Mirianashvili, Jojua 1996). This is the only example of such cupola design in Georgia and generally in Eastern Christendom. The rock-cut architects had no difficulty in placing the circular base of a dome upon a square or rectangular ground plan: there was no need in pandatives or squinches filling up the corners of the square, transforming it into a circle. In spite of this, transitional elements were maintained in Cappadocia, unlike Gareji, though there are several exclusions in Gareji as well, namely in Sabereebi monastery (8th-9th cc). Three churches out of the four, rock-cut in the central part of the monastery, are the domed churches. Squinches were rock-cut in the corners of a domed hall. Decorated columns support the squinches. Sabereebi differs from other monasteries not only in design but in fresco paintings as well.

Water cisterns unlike Palestine tradition were never rock-cut within cells. They are found at a distance of several dozen (as in Laura of St. David) or of several meters (in Dodorka, Natlismtsemeli, Udabno) from cells. Several monks shared the cisterns. Cisterns within the caves are found only in the refectories, probably with one exception at Chichkhrituri monastery where a cistern is found within a chapel.

Gareji church architecture fed by Palestine tradition had developed its own way, which fascinates us with daring solution, and deserves to be one of the constituents of the world heritage.

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ROCK-CUT AND MEGALITHIC MONUMENTS OF KVEMO KARTLI (SOUTH-EAST OF GEORGIA)

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The investigation of the megalithic monuments existing in Georgia has more than a hundred-year history. During this period some kinds of these monuments have been fundamentally studied. For instance, in Apkhazeti (north-west of Georgia) many dolmens have been explored archaeologically and have rather steady typological and chronological classification. They basically belong to the third millennium B. C. (Fig. 1.)

The Menhirs, among them stone 'Veshapi'-s (connected with the cult of a whale) and anthropomorphic samples, not easily dated by archaeological methods, are generally supposed to be the monuments of Bronze Age (Fig. 2.).

The historical province 'Kvemo Kartli' of south-east Georgia is particularly distinguished with plentiful megalithic settlements and citadels. A lot of such monuments are stated on the slopes, plateaus and capes in the river gorges of this region. Among them some are distinguished with grandiose scales. Such are, for instance, 'Cyclopean' settlements of 'Avranlo', 'Sabechdavi', 'Beshtasheni', 'Santa' (Fig. 3.). The walls and dwellings are built of large unhewn basalt stones (about 1-3 m long and wide) and are made of dry masonry. Thickness of the walls varies between 3-4m. Plans of some dwelling and household premises are approximated to geometrical layout and some are found even of free forms. Houses found are of one or several rooms. The width of entrances are from 1-2m up to 5m. The settlements are defended by several series of walls. One the territory of the settlements the so called 'Menhir's collonade' is stated.

The date of origin of the megalithic settlements in Kvemo Kartli remains problematic due to discordance of opinions among Georgian scholars which is not surprising because the archaeological study of the monuments is still at the initial stage. Recently after revealing intensive cultural layers from several such settlements the point of their dating was accordingly prepared causing the opinion to date them with the XIV-XIII cc. B. C., but lower layers of same monuments with the material evidence of early middle Bronze Age cast doubt on this date.

In our opinion, for thorough solving the problem of the origin of the megalithic settlements in Kvemo Kartli it is obligatory to carry out a complex investigation of these monuments together with Bronze Age rock-cut monuments of the same region.

The thing is that nearly the all above-mentioned megalithic settlements situated nearly with bordering rocky massifs, which are full of archaically planned rock-cut complexes of large and small sizes. As for some cave groups, they are cut along the terraces of the megalithic walls i. e. in fact they are the parts of the settlements. Another regularity may be noted as well the rock-cut type cave complexes which are situated far from megalithic settlements nearly always coexist with annexes of the megalithic masonry.

Some scholars paid attention to such a close neighboring location of the megalithic settlements with the rock-cut complex long ago, but their impressions were forgotten just the same way as the cave complexes.

These monuments had not been studied until recently from the standpoint of architecture and archaeology. They had not been either described thoroughly or measured architecturally. Professional archaeological historians had not formed a definite opinion about these monuments. Thus there arose a necessity for their bringing out and putting into scientific circulation.

The monuments under study are situated in river canyons. They consist of tiers of artificial caves in several tiers in basalt and dolerite rocks (Fig. 4.). In the structure of the vertical section of the monuments a certain regularity is

observed – the main number of tiers is situated in the lower register of the – rock. The overwhelming majority of caves are cut without the use of metallic tools. This proves to be one of the most ancient rock processing techniques in the world – having been heated with fire, the rock was doused with cold water and water-impregnate wedges were driven into the resulting rifts. Since such a technique makes it practically impossible to give more or less regular forms to basalt rocks, the caves are only roughly and occasionally geometrical. In the complexes dwellings with free, oval and approximating to rectangular layout are found. Their sizes vary in the range of 4 to 5 up to 15 to 20 sq. m. In most cases the height of the caves reaches the module of an upright position of a human being (Fig. 5-6).

The caves are cut at different distances from each other and often isolated. Irrespective of their forms they face terrace passageways with 50 to 100 cm openings. These openings often serve as the only lighting and ventilating source for dwellings. There are found neighboring groups consisting of two or more caves interconnected with passageways in the forms of doors tunnels along with the dwellings linked with space sections arranged in a more ordered fashion (Fig. 7-10).

Crudely cut household pits and hearths are still preserved in the caves. Constructively more sophisticated devices are not found in these complexes which is presumably conditioned by the unfavorable geological structure of the rocks. Other materials, chiefly wood, must have been used in making the household appliances as confirmed by nests in the dwelling walls. Nearly in all the complexes the facades of the damaged caves had been restored by dry masonry or slaked lime lying. Annexes with a complex layout are also found, chiefly preserved in the form of ruins. Floors in most of the caves had been covered with sterile or cultural layers of different thickness.

Durability, a specific feature of the rock-cut monuments, had from the very beginning presupposed their reiterative use. Especially complicated had it seemed to determine the original appearance, primordial functions and emergence time of these multilayered monuments. To solve this problem the results of layout and spatial analyses and those of the archaeological excavations of these monuments were to be compared.

On the basis of our studies in the first instance the earlier supposition concerning the primordial defensive function of the caves was refuted. Shelter-caves and the so-called fortress-caves of Medieval Georgia are more or less well known. Main features of such shelters include impregnability. They are characterized by a suitable strategic position and a number of elements needed for combat operations.

The majority of the monuments studied by us are characterized by contradictory features. They must have been quite obviously created as indivisible rock-cut complexes while all types of annexes represent a secondary phenomenon. Without these auxiliary fortifications the complexes would not meet the chief demand of defensive works – impregnability. Most of the caves are situated at the foot of the rocky massif and are easy of access. To get into the caves of the top tier is also easy as rather convenient paths lead there.

Nearly throughout the medieval period rock-cut hermitage-monasteries were as widespread in Georgia as in many other countries of the Christian world. In most cases monuments of the this category contain compactly or sparsely cut multitiered cave dwellings varied in number and purpose (e. g. David Gareji cave hermitage – monasteries). In spite of the difference in layout this group of monuments is outwardly somewhat semblant. The resembling appearance of the rock-cut monuments of Kvemo Kartli with Garedji monasteries seems to presuppose their possible use as monasteries, the more so as some of them included churches. However, as investigations have shown, none of them with the exception of the later annexes proves to have any indication of cult life. They fully lack rock-cut churches, chapels, refectories, worship niches, etc., that is to say, elements without which the existence of hermitage-monasteries of this scale is out of the question.

Despite the limited number of domestic appliances and architectural details well before the start of the archaeological works we had presupposed that the main nuclei of the cave complexes could have been secular settlements, i. e. rock-cut villages. Naturally in this case the presence of both dwelling and household buildings ought to have been presupposed. Such a differentiation is observed. Separate groups of the caves include both comfortable dry and well-lit caves of orderly layout cut at definite height and narrow and dark crudely cut buildings at the foot of the sheer slopes which we classify as household ones. Some of them could have been used for keeping cattle, etc.

In these cave complexes no unity of dwelling and household buildings of each family is observed. The so-called rock-cut houses are not clearly demarked. To all appearances the structure of these settlements had been meant for large human groups to live together on account of which they differ considerably from the rock-cut villages of Medieval Georgia known to us. The insignificant differences in sizes and degree of processing of the dwelling buildings are indicative of poor property differentiation of their inhabitants. Such a mode of life is characteristic to a patrimonial society.

The layout of these monuments differs markedly from the principles of the rock-cut architecture of the late antique (Uplistsikhe) and Medieval periods – as it has been mentioned above the overwhelming majority of the

these buildings is quite primitive. The said periods are not characterized by such cutting techniques of cave complexes, passageways in the form of a human silhouette and other details. These peculiarities together with close neighboring location with the above-noted megalithic structures caused our supposition concerning the origin of this type. We are seeking to prove that they were created in the Bronze Age.

This opinion is fully confirmed by the data of the 1986-1998 archaeological excavations. Large-scale archaeological works were carried out in Nakhiduri, Muguti, Samshvidle and Zurtaketi cave complex. Age could be found preserved in recesses of the rock foot of the caves and annulled household pits that were laid by adobe and cobbled floors during their secondary development. The most ancient materials are represented mainly by fragments of black and brown glazed ceramics of the late Bronze Age characteristic to the Middle and Early Bronze Ages. Evidently different layers of the Bronze Age had been transferred by later reconstruction's due to which it is very difficult to determine their stratigraphy.

Under these circumstances a great importance is to be given to the fact of finding of an undisturbed layer of the Bronze Age on the floor of one of the complex caves situated in the close vicinity of the site of ancient Samshvilde citadel. Habitation traces of different periods of the Bronze Age have been preserved considerably better in this cave which had fatefully escaped later reoccupation. Under a sterile 50 to 70 thick ground layer this building reveals a flattened earthen floor fully covered with differently preserved numerous ceramic fragments of the late Bronze Age (up to 200 units) and obsidian chips. There are found a lot of crocks of black and brown pots, basins, bowls and plates of different forms. Some of the samples have retiform, wavy, wedge-shaped and florid decorative patterns typical to the given period. There can also be found zoomorphic lugs, bent corrugated whorls, wave-profiled vessel walls and other details reliably dating this material (Fig. 11.).

The recess under the adobe floor of the late Bronze Age has revealed ceramic fragments of the initial stages of the Bronze Age (Fig. 12.). They include glitter-glazed black clay ceramic fragments some of which have stamped and wavy decorative patterns. They date back to the Middle Bronze Age though this period too serves as the lower chronological limit to this building. Approximately in the analogous stratigraphic situation have been confirmed crocks from the greyish-brown pot with a pair of protuberances like female breasts on walls. This motif has been known from the late Aeneolithic and Early Bronze Mtkvari-Araks monuments in Georgia and evidently remained within the limits of the Middle Bronze Age. It is noteworthy that some fragments of black ceramic (of the Bedena type) have been found in the process of cutting the caves which is indicative of the simultaneousness of making both this material and the building itself. The late Bronze Age floor has also revealed Tearth fragments with profiled edge and protuberances around 50 cm in diameter. This series of articles (of the 'Kvatskhelebi' type) is well known from the archaeological materials of the Early Bronze Age Georgia. It is noteworthy that the late Bronze Age has destroyed and mixed the Early and Middle Bronze Age layers in the same manner as in other caves of Middle Ages has done with the material evidence of the Bronze Age periods.

We appear to have the right to spread the conclusions drawn from the archaeological investigation of this building to other rock-cut complexes, the more so as the inventory of the accidentally preserved most ancient layers there corresponds to the suggested chronological scheme.

Apparently the megalithic settlements of Kvemo Kartli and the investigated cave complexes are linked not only due close neighboring location but also due to the fact that they belong nearly to the same period. As the function of the majority of megalithic buildings and cave complexes is beyond any doubt it becomes clear that during the late Bronze Age the population of this region naturally lived in both types of these settlements. Evidently, the above-described final form of the megalithic and cave complexes and their unity (without medieval reconstruction's) represents this stage of their living there.

Because of the existing fragmentary archaeological, the exact date of the origin of the megalithic and cave complexes and the problem of superiority of these settlement forms turns much more vague. On the basis of the existed material we are tend to admit that both forms of the settlements were original on the territory of Kvemo Kartli nearly at the same in the third millennium B. C. between Early and Middle Bronze Age.

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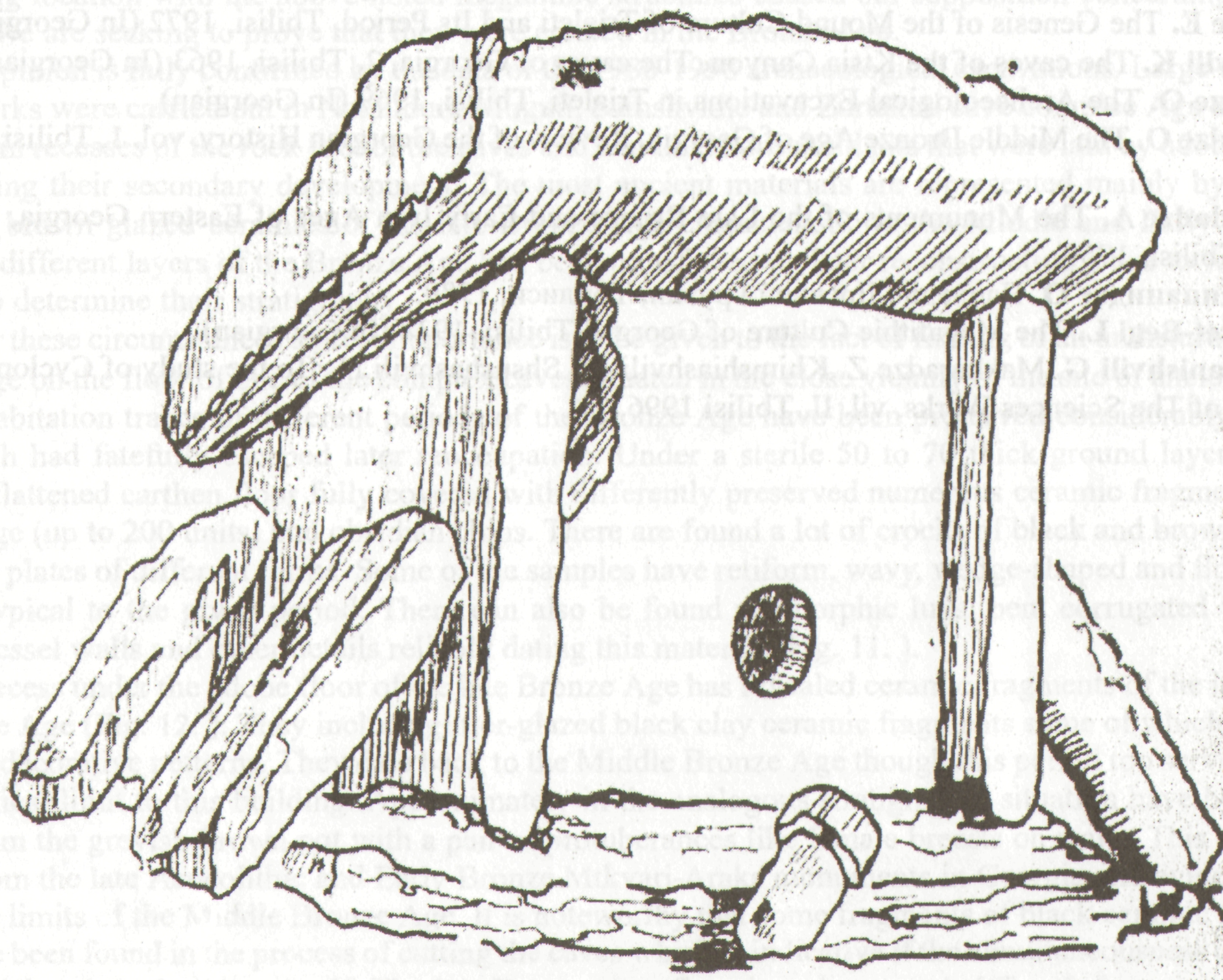


Fig. 1. a



Fig. 1. b



Fig. 11. a

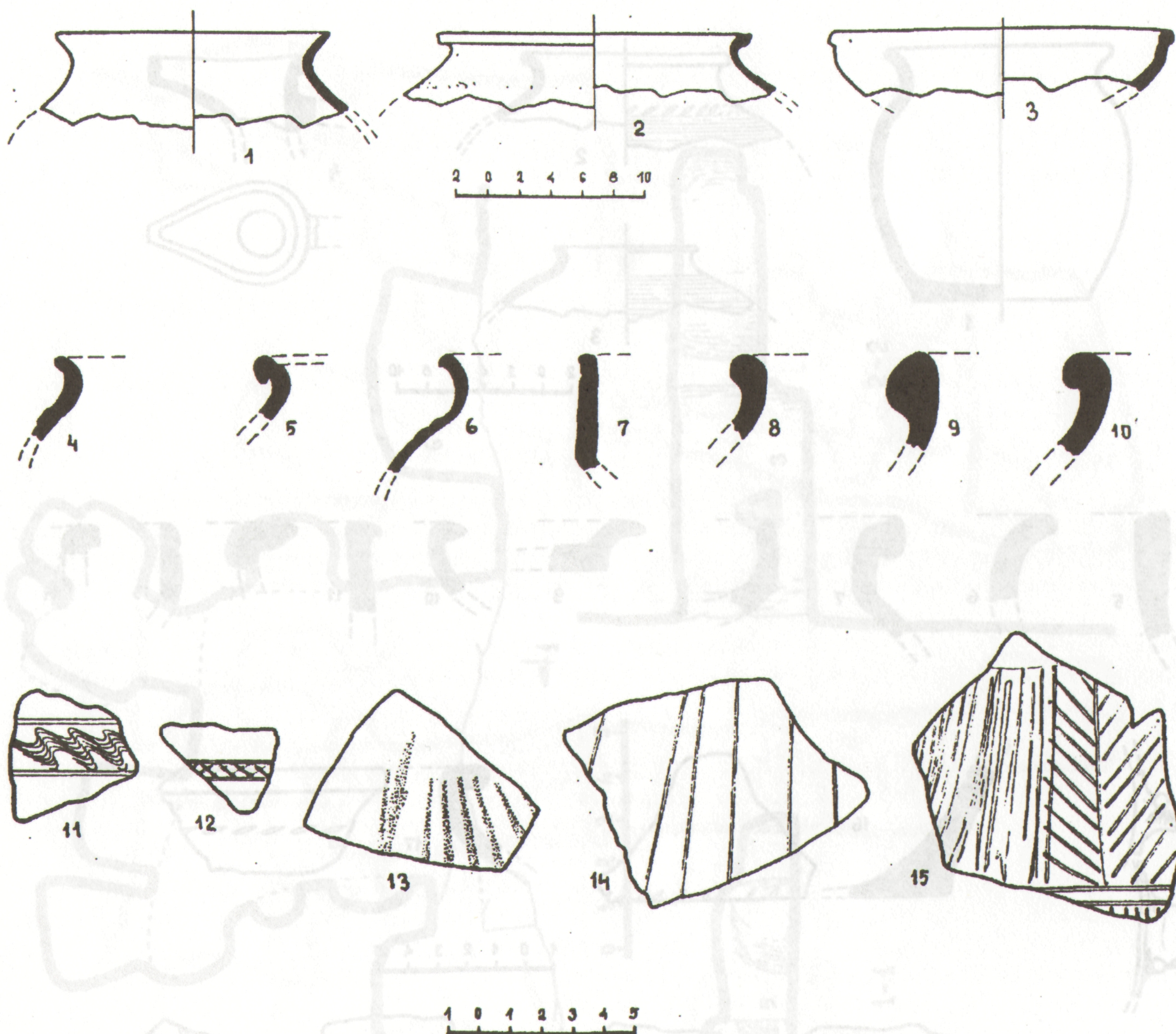


Fig. 11. b

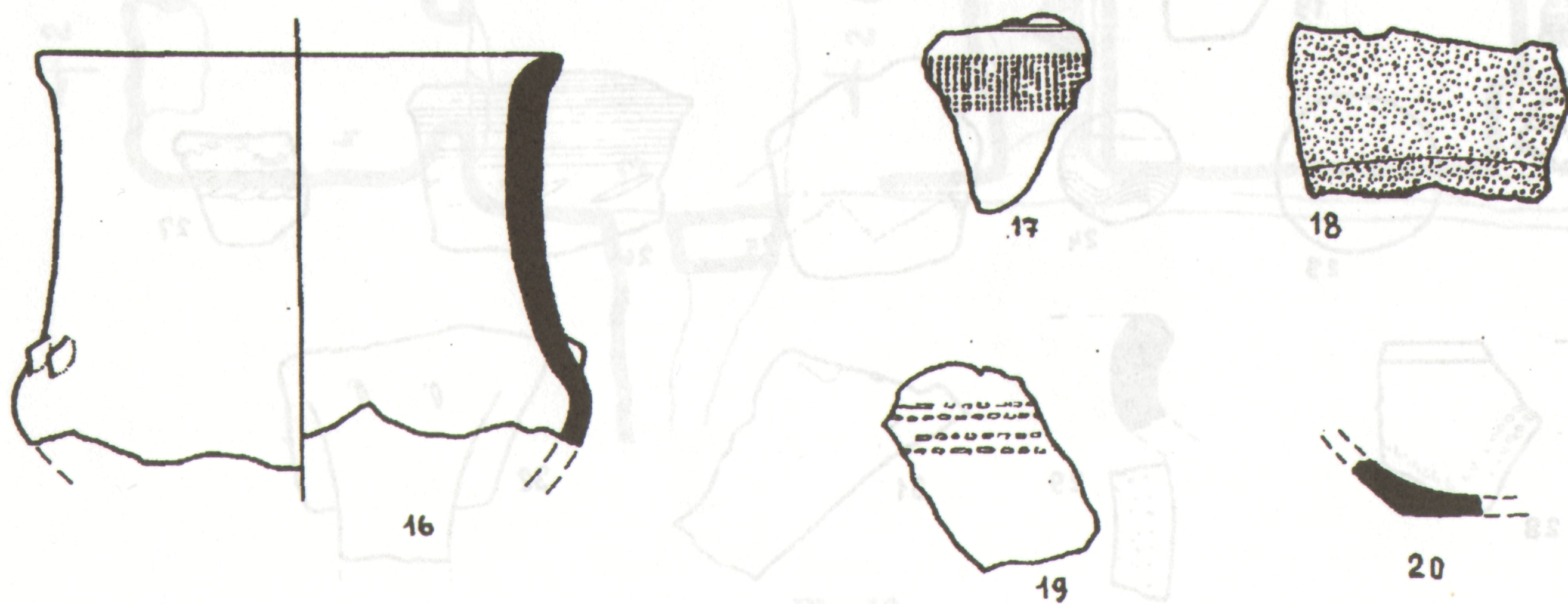


Fig. 12

THE KIEV LAVRA CAVES

Elena Vorontsova

Kiev Lavra or Kiev—Pechersk Saint Uspensky Monastery is a historic—architectural ensemble, which is included into the list of UNESCO's monuments. It is an acting monastery even today. This monument is famous because of its ancient history, unique architecture, activity of its devotees, but most of all – because of the activity of its caves' monuments which are almost 1000 years old.

The whole territory of Kiev Lavra is divided into two parts – the upper and the lower (picture 1).

Today at the lower territory of Kiev – Pechersk Lavra function two cave's complexes. They are – the Near and the Distant Caves. These names the caves were given in XVII-XVIII centuries and these names were dependent on the distance from the main temple of the monastery – Uspensky Cathedral.

The first monks lived in the Distant Caves in XI century. They also mastered these Caves (picture 2). Today the so-called Varyazhskaya Cave is also included into this complex. This cave in ancient times was isolated labyrinth. In the late Middle Ages the corridor joined the Varyazhskaya Cave with the Distant Caves.

The Near Caves had already existed when the founder of the monastery Reverend Anthony lived (XI century) (picture 3).

The Lavra Caves' labyrinths were dug in slightly caseharden kaolin sandstone on the depth from 5 to 15 meters from the surface. The sandstone has the qualities of stony rock, but at the same time even the primitive instruments can easily work it up.

The length of the Near Caves is approximately 400 meters; of the Distant Caves is 300 meters; and of the Varyazhskaya Cave is 200 meters. The width of the Caves' labyrinth is from 1 to 1,5 meters, the height is 2 – 2,5 meters. The exception is underground churches, which are the biggest caves' premises. There are 3 churches in each complex. They were building since the foundation of the monastery till XVII century.

The Kiev Lavra Caves are enigmatic and they are not investigated completely even today. If the history of Kiev—Pechersk Lavra Churches and its premises is well known from chronicles and from literary information, the history of the caves' development is not described in any source. We know that the founder of the monastery Reverend Anthony came to Kiev from Saint Aphon. According to one of the versions he found a small cave on the Kiev hills and settled there. Later Anthony gathered people who shared his believe and they widened the caves, dug the fist cells and church. Then, Anthony went away to another cave, where he lived alone till his death.

These events took place in XI century and they are fixed in the chronicle "Povest Vremennykh Let" (Shakhmatov 1916; p. 223-225).

When the monastery grew bigger and the first cells and churches were built on the surface, the monks began to use the caves as an underground cemetery. This cemetery functioned till XVII century. Since the end of the XVII till the beginning of the XVIII centuries the caves in the monastery are constantly reconstructing and they are adapted to be attendant by a great number of people (Zhylenko 1997; p. 21). So, the caves acquire their modern look in XVIII century.

The explorers take the information about the development of Lavra Caves' complexes from different sources and they interpret this information differently.

Confirmation or negation of this or that version is taken through the architecture—archeological researches.

Kiev Lavra Caves are the biggest caves' labyrinths in Kiev and they are included into the Historical—Cultural Reserve and into the acting monastery.

The first archeological excavations were held in the Near Caves in 1930-ies. But the materials of these works are not preserved.

In 1967-1968 were held the excavations in the Distant Caves. At that time was discovered one of the premises full of remains in which there were four so-called beds. Besides, several funeral niches were revealed and investigated. When the excavations began, open premises were bricked up. Only some niches had small windows and tables behind them, where the names of the recluses, buried there, were written. But we can not call these works — archeological investigations of full value, because the bigger part of the caves' complex remained uninvestigated. Till the latest time there were no systematic archeological excavations in the Distant Caves.

In the late 70-ies repairing—restoration works in the Near Caves of Lavra. During these works were discovered unknown early graves under the slabs of the floor. So, it was a necessity to make some researches.

The Archeological Institute of the National Ukrainian Academy of Science, the collaborators of the Museum Caves' History Department and the group of speliologists held the archeological excavations during one year.

The finds were rather interesting and they belonged to the Early and Middle Ages periods. First of all 17 graves were found under the slabs of the floor. Behind the plastered and whitewashed walls were revealed 133 funeral niches, 17 crypts and cells, 2 wooden sections, the whole length of which was 142 meters. On the walls of these sections there were fragments of wall paintings and graffiti, which date back to the XI—XVII centuries. In general, 522 caves were learnt during the researches.

Perhaps the most interesting finds are two open ancient branches of the caves. These branches were conditionally called "The Section of Nestor" and "The Section of Mercury". On the "Mercury's Section" the length of which is 65 meters, were found the masonry from ancient Rus brick, some fragments of paintings on the ground and a wooden pillar.

Radiocarbon analysis of the wood showed that it belonged to the XII century. "The Nestor's Section", which length is 76,5 meters has very difficult configuration. Some funeral niches and cells were found here. On the walls of the cells and in the gallery archeologists found a great number of graffiti which were drawn on the ground by the sharp instrument. Most of these inscriptions date back to the first quarter of the XVIII century. They are written in Russian, Church—Slavonic, Polish languages and one of them is in Armenian. The main content of these inscriptions is the name, the surname and the date when the caves were visited. Especially interesting is the inscription in Ancient—Rus with the date of 1150 (XII century). It is situated under the cell entrance, which is the end of the section. Large letters (2,5sm) writes the text of this inscription and it consists of 3 lines. Remained lines of this inscription are the following: "In 1150 this place was dug to put the (body)..." (Vysotsky, 1985; p. 63-64).

In the Southern part of the cave's labyrinth the necropolis was opened. The funeral niches (dimensions: the height of the mouth is 36-42sm, the width is 45-60sm and the length is 2m) are situated mostly in two tiers perpendicular to the corridor. As a rule, these niches were full of remains. There were Polish—Lithuanian and Russian coins of the XVII century (approximately 300 coins); monks leather belts, crosses (paramand) of the XI-XIV centuries, wooden thimble crosses of the XIV century in the graves of the niches, cells and crypts. Besides, there were fragments of different glass, ceramic, wooden and leather goods of the XI-XVIII centuries.

At the same time with archeologists worked a group of anthropologists, who determined the age, the sex of buried and their lifetime pathological changes (Report 1979;p. 125-127).

The excavations, which were held in Lavra Caves, gave a valuable architectural, historical—archeological and paleographical material to the science. Ancient sections and premises, which were discovered during the research works, represent the primary view of the caves and "the cells and crypts represent the premises for living and graves of monks". The inscription, which dates back to XII century, clearly shows that at the earliest period of the monastery existence, the monks were buried in the caves. The funeral niches, which were used for graves frequently and which, according to the inventory, date back to the XI-XVII centuries, prove that in XVII century new sections of the caves were used for cemetery and in the old ones the monks were buried.

In 1988 the Department Committee was created to learn Lavra's mummies. It includes physicians of different specialties, who carried out personal identification of the most famous historical personalities (Kolpakova, Kabanets 1997;p. 85)

At the same time with these works in the Near Caves of Lavra was carried out the plastic reconstruction of bones remains from the tombs, which belonged to the historical personalities of the Kiev Rus period. The famous Russian anthropologist M. Gerasimov (1907-1970) worked out the method of plastic reconstruction of the face by the skull. During the latest years were created the sculptural portraits of Nestor—Chronicler, Agapit—an ancient doctor, the first Father—Superior of the monastery—Varlaham, the first Archimandrite Polikarp, Russian epic hero Ilya Muromets. At present time the work continues (Vorontsova 1991; p: ...). So, the researches held in the Near Caves of Lavra, for the last decades are the largest scale.

Till today the Distant Caves and Varyazhskaya Cave remain unlearned.

In 1988 began the spelaeo—archeological excavations. The aims of these works are to carry out the guard researches of the cave, to determine its purpose, to date the separate sections of the underground passages and the whole cave complex, to make graphical and photo fixation. Also, it is very important to define more precisely the Varyazhskaya Cave plan, which was made in 1968; to fix inscriptions—graffiti, to make archeological excavations of the separate sections; architecture—archeological measurements.

At the same time with the archeological excavations, the microclimatic and microbiological investigations of the cave started.

The first works in Varyazhskaya Cave were held with the aim to learn more about three cells. As the result of these investigations it was found that one of these cells was dug between XVII and XIX centuries and it was the place for prayers. The second cell was dug in XI century. It was consolidated and the plan of it was changed at the first half of the XIX century. It was the place of reclusion. The third cell (also secluded) was dug in XI century. In XVII—XIX centuries it was used as ossuary (lat). Brick consolidated its walls at the first half of the XIX century. On the walls of the cells and cave's sections were fixed some inscriptions of the XI and XVII—XIX centuries (Stikhar 1998; p. 145—146).

Now the works, which can help to learn more about Varyazhskaya Cave, are still in process and they promise to give very interesting material.

The caves, which are situated at the lowest territory of the monastery, are not unique underground constructions of the Kiev Lavra. The upper territory of the Lavra, where the main architectural ensemble is situated also presents us very interesting surprises.

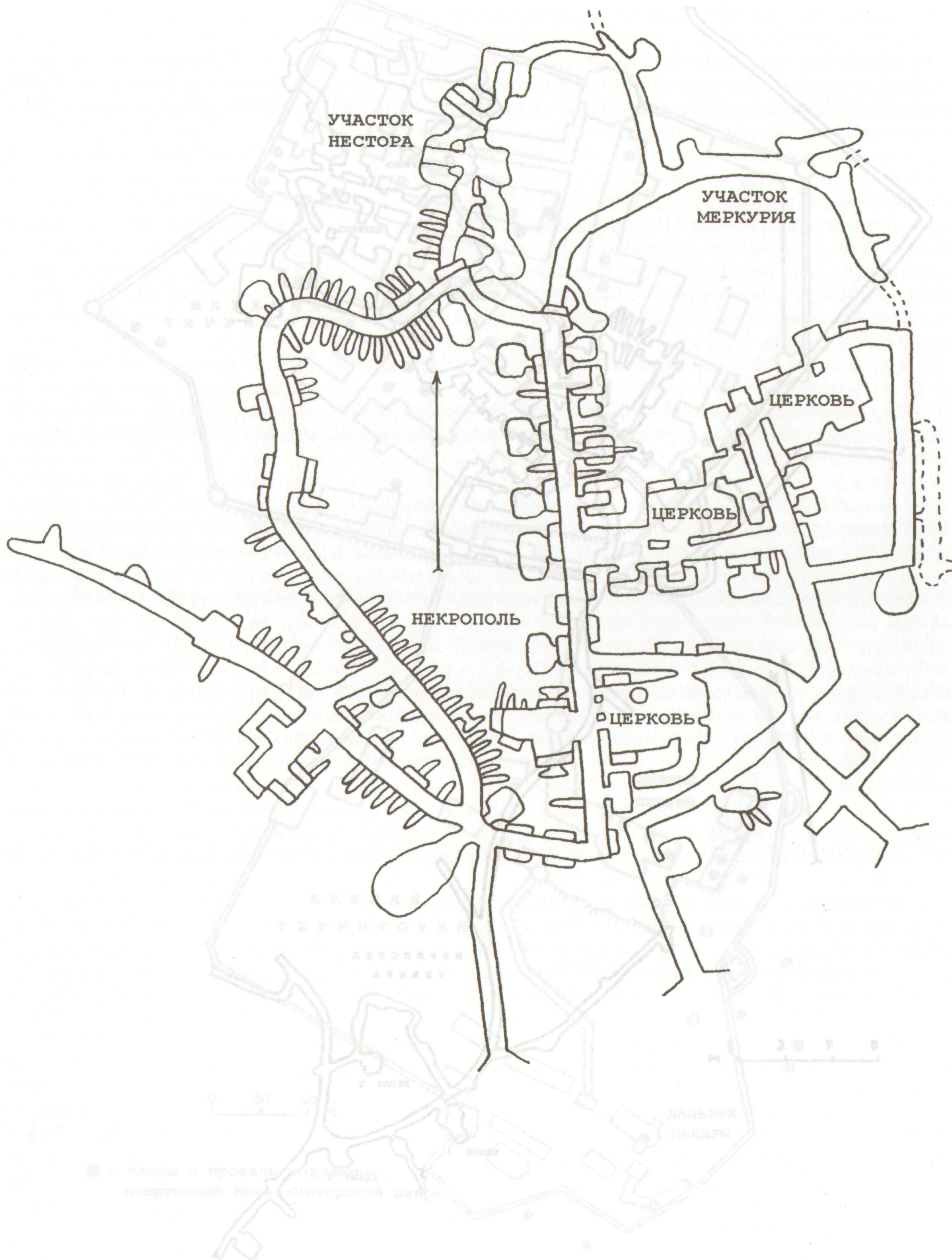
Some years ago Ukrainian Government made a decision to restore the destroyed the World War II the main temple – Saint Uspensky Monastery – Uspensky Cathedral, the architectural monument of the XI—XVII centuries. So, it became necessary to learn the territory around the ruins of the Uspensky Cathedral and its inner space. In 1998—1999 were held the research works of the underground objects and constructions by the method of the distance electromagnetic sound. The underground passages, vacuums, caves were revealed without opening the soil and without archeological excavations. They were revealed with the help of electromagnetic scanners (radars) of underground sound or georadars (Report 1999).

As a result of these works the whole net of underground constructions was revealed with the help of instrument at the investigated territory. It was situated in two tiers, i. e. on the different levels from the surface. Probably, each construction around the Uspensky Cathedral and the Cathedral by itself had underground passages. One can assume that they were bound in one system and perhaps they were created on the basis of an ancient cave's constructions.

So, in the cave labyrinth of the Lower territory of the Kiev Lavra and in the underground constructions of the Upper territory in the nearest time the research works will be carried out, the results of which will bring us new additional material.

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THE RESEARCH WORK AT THE MONASTERY OF VITOVNICA. LATEST RESULTS.

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The cave monasteries and the rock-cut sanctuaries in general have always been an important part in research of medieval history of Serbia,¹ being deeply rooted in Byzantine models.² But there is still much to be done in gathering basic data on exact number of the sites and their structure. According to the latest investigations, so far the earliest appearance of a cliff laura on territory of Serbian medieval state is to be found at the Monastery of St Archangels at Ras, dated to the end of the 12th century.³ Considering the date of Sava Nemanjic's Karyes typicon (1199) the Serbian hermitage of St Sabas of Jerusalem in Athonite centre was also founded at the very end of the 12th century.⁴ Hermitages in the vicinity of the great Studenica monastery may as well be early enough.⁵

The most important Serbian cave laura in the 13th century and later coenobion emerged at the very spring of the cult of the widely known hermit St Petar of Korisa, around his cell and the original tomb.⁶ Throughout the 14th century huge anchoretic dwellings were erected near large monastic and political centres, especially in Kosovo, around Pec, Decani and Prizren.⁷ Similar rock-cut settings were also noted in Byzantine and Serbian Macedonia, around Ohrid,⁸ in Meteora,⁹ Tikves,¹⁰ Lesnovo¹¹ and in Serbia proper, in the 14th and 15th centuries in the gorges of Gornjak¹² and Crnica.¹³ That widely disseminated eremite tradition was later followed through the Postbyzantine period as well.¹⁴ Although the above presented list of sites is an impressive one, there are many more to be properly discovered and fully interpreted, e. g. near medieval fortifications of Svrljig¹⁵ and Lipovac¹⁶ or around monasteries of Resava, Ravanica and Josanica.¹⁷

Among these almost unknown examples of medieval anchoretic settlements, we can now present a new one – the monastery of Vitovnica, situated only 10 km eastward from Petrovac on the Mlava in Eastern Serbia. The monastery is built right under the huge rock, at the foothills of the Sumorovac mountain, being part of the wild Homolje region. The complex is consisted of the church dedicated to the Dormition of the Virgin, two rather new buildings with monks' cells, remnants of the monastery walls and several anchoretic structures.¹⁸ Except for the church none of the above mentioned parts have been previously explored.

Due to a complete lack of all written documents on monastery's earliest history, the time of its erection is not known.¹⁹ Nevertheless, it is sure that the monastery church had been restored at least twice. Firstly, at the end of the 17th century the reconstruction of the narthex took place.²⁰ This intervention can be clearly seen on the southern facade.²¹ Secondly, in 1856 a bell-tower was added to the western side of the church. In the same year the church interior and the western facade were painted by the local artists Milija and Ivan Markovic.²²

But the monastery of Vitovnica is more renowned amongst historians for the famous Vitovnica inscription, the stone slab carved with both Old Armenian and Old Slavonic letters, found in the 19th century and now built in the northern church wall.²³ This is the well-known foundation inscription of an Armenian named Lado, son of Babug, who in 1218. erected the church of St Jacob and Peter.²⁴ Recently a new attempt has been made to find out the original location of the church, from which comes the slab with the inscription.²⁵

In 1733 Maksim Ratkovic, who was the envoy of the Belgrade metropolitan, had the opportunity to make a visit to Vitovnica. He saw then dozens of manuscripts and old books in the monastery, which have been later taken away by foreigners and monks.²⁶ Only one of these missing manuscripts is now preserved; it is the famous Gospels of Vitovnica, written and illuminated in the first half of the 16th century.²⁷ In 1557 Kondo Vuk, a famous Serbian goldsmith, made new excellent bindings for the cover of the manuscript, with twelve scenes of the Great Feasts²⁸

and with a long inscription which has the oldest preserved mention of Vitovnica.²⁹ The manuscript was taken afterwards to the monastery of Besenovo in Fruska Gora³⁰ and is now kept in the Museum of Serbian Orthodox Church in Belgrade.³¹

Among the local people one can hear interesting stories describing legendary foundation of the monastery. According to the first one, the church was built in the 13th century, during king Milutin's reign (1282-1321).³² Another one speaks about an unknown hermit "Sinaites" as the founder, stressing the fact that his alleged tomb, constructed in the northern part of the naos, has been venerated until today.³³ A few years ago V. Ristic supposed that the church should be dated before 1389, pointing unfortunately to the monastery of Sisojevac and other churches from Branicevo as analogous monuments, which in turn have not been dated precisely.³⁴ In treatment of its facades the Vitovnica Dormition church owes much to the concept of the Resava Trinity church (1418).³⁵ Therefore, it is more probable that it was built in the 15th century. Today it is only the trefoil plan suggesting the possible general dating of the Vitovnica church to the end of the 14th and the beginning of the 15th century.³⁶

V. Ristic also pointed out an unusual painted niche on the southern facade.³⁷ Obviously, he was not able to identify it as the prothesis niche belonging to the remnants of a totally destroyed side chapel (parecclesion), although the identical addition to the main church can be found in the monastery Namasija in the Crnica gorge, dated to the same period.³⁸ The traces of the 16th century frescoes in the niche and beside it prove that the chapel was painted and that it was most probably added then.³⁹ At the same time, these remnants bring fresh evidence that the Vitovnica monastery saw another reconstruction in the 16th century too.

All that was said proves that the monastery did have a very long and a very complex life, from the Middle ages onwards. Our main task here is to point out all those monastery structures which have never been investigated before. It is, therefore, very important to note that the Vitovnica church is surrounded from the north, west and south by huge monumental walls. These walls are most probably medieval, considering its characteristic construction made of semi-dressed and broken stone in a lime bond.⁴⁰ The one to the north of the church (15 m long, ca. 6 m high) represents a piece of original masonry, built as a supporting wall in order to prevent possible rockslides from the hill. For that purpose the northern wall is also strengthened with two massive pillars (75 cm thick, 1.30 m wide).⁴¹ That is why the western part of the wall is connected with the northern cells, while its eastern end leans directly to the rock, which closes the church to the East. Here one can notice a perfectly conserved bearing for the beam which once must have carried the floor level of an uncertain monastery construction.⁴²

To the south of the church, behind the southern cells, upon the steep side of the hill rises another monastery wall (25 m long) with various height measures due to the destruction of its upper part. Very interesting remnants of the wall construction are also to be found to the west of the church. Today the monastery gate is completely lost, but its original position can be precisely identified on the spot between two wall constructions (the left one: 14 m long, 3 m high; the right one: 4.80 m long, ca. 2 m high) touching the western edge of the southern building. The gate might have originally been constructed as the tower, considering the quantity of the material used. But we find the most attractive details at the western wall, climbing the hillside (15 m long, ca. 2 m high). On its outer face the wall originally had two supporting pillars, triangular in section. The northern one is now completely covered by the poison ivy, as most of the wall areas in the monastery. The southern pillar is regrettably heavily damaged and now only its base is visible.

The remaining wall constructions give clear evidence that Vitovnica was early established as coenobion. But given the fact that there are several other structures belonging to anchoritic dwellings, a question arises concerning the original monastic organization and the date of the first anchoritic settlements. Right under the rock, in a small spatial corridor to the East of the southern cells, one finds an exciting proof of an authentic eremite setting. A staircase consisted of five manually hewn steps gives way to the hermitage (3 m wide, 1.70 m high, 2.50 m deep) made in a small rock-shelter (Fig. 1). Traces of a cult are still being alive, since one can see dark sooty walls and numerous candles in the interior. The cave seems to have been improved in order to provide basic elements for its religious function, although the licking of the waters largely roughened the surface of its interior. Still, it really looks that the altar niche (70 cm wide) with its flat bottom and semicircular arch was indeed cut into the eastern wall of the cave. There is also a deep hole to the left of the altar niche, suggesting the usual position of prothesis.

But if both of the altar elements have not been made by human hand, then we are faced here with one of the main topos of the eremite tradition. If not adapted for the cult, the cave was the acheiropoietos, or not made by hand, the perfect place to "transform the desert into a city" of monks and to challenge the Evil.⁴³ The little cave is set below the huge rock dominating the picturesque gorge of the Vitovnica river, being itself an "acheiropoietos stylos," the monastic pillar, a divine creation invested with special connotation largely discussed in ascetic literature (Cyrill of Skythopolis).⁴⁴

To the left of the hermitage another rock-cut staircase, consisted of four very small steps leads up to the narrow manually hewn path overlooking the church. The path leads northwards where one unexpectedly discovers, hidden under the dense vegetation, significant remnants of an apse (Fig. 2) (2. 30 m long, 4 m wide, 2. 10 m deep, 1 m high). It is very important to try to find the answer whether the apse originally belonged to the cenobitic monastery as another parecclesion or was it prior to the catholicon, in which case it could have been part of the previous monastic dwelling. Since its axis lies almost in line with the axis of the catholicon, it is likely that it marks the earlier phase of the settlement, that which may well have been lauriotic. A very interesting comparison may be drawn with the nearby monastery of Gornjak, where there is at the foothill of the rock the main church and in the upper level, in front of the hermitage a small chapel.⁴⁵

The beautiful gorge of the Vitovnica river, situated only 20 m from the monastery walls, offers perfect conditions for an eremite sanctuary (Fig. 3). Here, among the beauties of the nature, one finds clear evidence for the persistence of the eremite tradition, a modern mosaic of St John the Baptist, applied directly to the rock. We cannot be sure does it really repeat an older representation of the saint. Anyway, it is set above the water well constructed by an abbot, implying thus all the Christian connotations of the holy water. Moreover, through the image of St John placed near the living waters, the gorge was given a symbolic Palestinian background with all of the fathers of the desert, recalling the holy baptism of Christ in the river Jordan. With such symbolic constructions monks succeeded to reach the highest ideals of eremitism, that is, to live permanently with Jesus Christ.⁴⁶

But the eremite tradition is especially proved inside the Vitovnica gorge. High side rocks with conical peaks do have the exact form to which epithets of *acheiropoietos stylos* may be properly attributed. Over steep cliffs above the river there are still several large wall constructions made of broken stone in a lime bond (Fig. 4). These constructions served to make shelters for the most devout hermits who used to spend their hour in deepest seclusion, dedicated to the prayer and the manual work, including book copying and manuscript decorating. Such hermits, representing monastic elite, were also called *stylites*.⁴⁷

Since the rock is still inaccessible, further investigations should be led towards discovering and documenting the full scale of cave hermitages and corresponding wall constructions. Along with the field work an archaeological campaign will surely bring more light to this unexplored anchoretic dwelling. Obviously it had different phases in its history (hermitage, *laura*, *coenobion*). Further systematic research must give answers concerning the chronology of the complex and the insight into the organization of the oldest settlement.

NOTES

¹ Cf. S. Popovic, *Krst u krugu. Arhitektura manastira u sredovekovnoj Srbiji*, Beograd 1994, 96-102.

² Cf. G. N. Chibinashvili, *Peshternije monastiri. Ocherk po istorii iskusstva Gruzii*, Tbilisi 1948; C. Mango, E. J. Hawkins, *The Hermitage of St. Neophytos and its Wall Paintings*, DOP 20 (1966), 121-206; D. M. Nicol, *Meteora. The Rock Monasteries of Thessaly*, London 1975; L. Rodley, *Cave Monasteries of Byzantine Cappadocia*, Cambridge University Press 1985; Y. Hirschfeld, *The Judean Desert Monasteries in the Byzantine Period*, New Haven-London 1992; J. Patrich, *Sabas, Leader of Palestinian Monasticism. A Comparative Study in Eastern Monasticism, Fourth to Seventh Century*, Washington D. C. 1995; R. Morris, *The Origins of Athos*, in *Mount Athos and Byzantine Monasticism*, London 1996; V. Korac, M. Shuput, *Arhitektura vizantijskoj sveta*, Beograd 1998, 124-134.

³ Cf. D. Popovic, *The Earliest Appearance of Cliff Laura in Medieval Serbia – the Monastery of Holy Archangels at Ras*, in International Conference "The Rock-Cut Monuments of East and South Europe", Tbilisi-Borjomi-Akhaltzikhe-Gori, 14-20 September 1998 (in press); D. Popovic, M. Popovic, *Pecinska lavra Arhangela Mihaila u Rasu*, Novopazarski zbornik 22 (1998), 15-58 (= *Cliff Laura of the Monastery of the Holy Archangels at Ras*, *Starinar* XLIX (1998) in press). Also, cf. K. Boshkovic, *Arheoloshka istrajivanja pecine-isposnice u Rasu*, Novopazarski zbornik 1 (1977), 15-36; K. Mitrovic, *Likovni i pisani dokumenti pronageni u pecini "Isposnici" na Rasu*, Saopshtewa RZSSK XIV (1982), 221-230.

⁴ Cf. Sveti Sava, *Sabrani spisi*, Beograd 1986, 14-16, 37-40, 85, 149, 159-161; S. Nenadovic, *Osam vekova Hilandara. Gragewe i gragevine*, Beograd 1997, 38-47 and for the later period cf. *ibid.*, 125-130.

⁵ Cf. R. Stanic, *Freske u Dowoj isposnici sv. Save kod Studenice*, ZLUMS 9 (1973), 113-136; S. Temerinski, *Gorwa isposnica u Savovu kod Studenice*, in *Osam vekova Studenice*, Beograd 1986, 257-260; R. Stanic, *Spomenici graditeqstva od XIII do XVII veka u okolini Studenice*, in *Blago manastira Studenice*, Beograd 1988, 255-259.

⁶ Cf. D. Popovic, *The Cult of St Petar of Korisa. Stages of Development and Patterns*, *Balkanica* XXVIII (1997), 181-211. Also cf. T. Boshkovic, R. Qubinkovic, *Isposnica Petra Korishkog. Arhitektura, istorija i jivopis*, *Starinar* n. s. VII-VIII (1958), 91-110; V. J. Turic, *Najstariji jivopis isposnice pustinojiteqa Petra Korishkog*, ZRVI V (1958), 173-202; O. Markovic, *Ostaci manastira Petra Korishkog*, SKM IV-V (1971), 409-423 N. Antic-Kommenovic, *Neobjavqene freske Bogorodichnoi detiwstva*

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⁷ Cf. M. Ivanovic, *Zadubine Kosova*, Prizren-Beograd 1987, 395-396, 499-500; S. Popovic, *Krst u krugu*, 98-99; M. Ivanovic, *Isposnice Uqarice i ostaci srpskih crkava u slivu reke Mirushe*, Saopshtewa RZSSK XIX (1987), 206-210; D. Popovic, *Sredwovekovne pecine – isposnice u Prizrenskom kraju – prethodna istrajivawa*, I[^] XLIV (1997), 129-154 (with bibliography).

⁸ Cf. T. Mano-Zisi, *Crkve u okolini Ohrida*, Starinar VI (1931), 136-137; T. Boshkovic, K. Tomoski, *Sredwovekovnata arhitektura vo Ohrid*, Ohrid 1961, 98-99; G. Subotic, *Pecinska crkva Arhangela Mihaila kod Struge*, ZFF VIII (1964), 299-331; P. Miqkovic – Pepek, *Peshternata crkva Sveti Erazmo kraj Ohrid*, Skopje 1994.

⁹ Cf. G. Subotic, *Poceci monashkog jivota i crkva manastira Sretenia u Meteorima*, ZLUMS 2 (1966), 127-176

¹⁰ Cf. S. Radojcic, *Crkva u Koniuhu*, ZRVI I (1952), 148-167; B. Babic, *Pecinska crkva svetog Lazara u Tikveshu*, ZLUMS 3 (1967), 161-170; M. Radujko, *Dradwanski manastiric sv. Nikole. I Nastanak i arhitektura*, Zograf 19 (1988), 49-61; M. Radujko, *Dradwanski manastiric sv. Nikole. II Jivopis*, Zograf 24 (1995), 25-38.

¹¹ Cf. D. Todorovic, *Lesnovska isposnica svete Bogorodice*, Zograf 8 (1977), 59-62; S. Gabelic, *Lesnovska isposnica sv. Ilije*, ZLUMS 18 (1982), 171-187; S. Gabelic, *Nepoznati lokaliteti u okolini lesnovskog manastira*, ZLUMS 20 (1984), 163-174; S. Gabelic, *Manastir Lesnovo. Istorija i slikarstvo*, Beograd 1998, 239-245.

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¹⁵ Cf. T. Boshkovic, *Sredwovekovni spomenici Istocne Srbije*, Starinar n. s. II (1951), 225-229.

¹⁶ Cf. B. Cvetkovic, *The Eremite Tradition in Late Medieval Serbia. Some Aspects and Problems of Research*, in International Conference "The Rock-Cut Monuments of East and South Europe", Tbilisi-Borjomi-Akhalsikhe-Gori, 14-20 September 1998 (in press); B. Cvetkovic, *Manastir Lipovac. Prilog proucavanju*, Naucni skup Kulturno-istorijska bashtina Jugoistocne Srbije (VII), Narodni muzej Leskovac 8-9. oktobar 1998, *Leskovacki zbornik XXXIX* (1999), 79-100.

¹⁷ Cf. B. Cvetkovic, op. cit.

¹⁸ For a brief description cf. R. Stanic, *Vitovnica*, in *Kulturna riznica Srbije*, Beograd 1996, 289.

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²⁰ Restoration carried out by Paun Matejic from the village of Melnica, cf. M. Milanovic, *Vitovnica*, in *Enciklopedija likovnih umjetnosti IV*, Zagreb 1966, 538.

²¹ Regrettably the conservation works have not been published yet.

²² According to the ktitors' inscription, the work was carried out by the abbot of Vitovnica Hadji Stefan, cf. M. Riznic, *Manastir Vitovnica*, 10-11.

²³ M. Riznic, *Manastir Vitovnica*, 11-12.

²⁴ Q. Stojanovic, *Stari srpski zapisi i natpisi I*, Beograd 1902, 5; G. Tomovic, *Morfologija cirilickih natpisa na Balkanu*, Beograd 1974, 38; A. Margos, *Bulgarsko-armenski nadpis ot 1218 g. ot Vitovnishkiya manastir*, Bulgarski ezik 2 (1983), 13-136; M. Ivanovic, *Kirilski epigrafski spomenici iz Srbije, Crne Gore i Makedonije*, Katalog, Beograd 1984, 6, br. 5; S. Smyadovski, *Bulgarska kirilska epigrafika IX-XV vek*, Sofiya 1993, 63, 191-192.

²⁵ B. Knejevic, *Ploca sa dvojezicnim natpisom iz 1218. godine u Vitovnici*, Saopshtenia RZSSK XXIX (1997), 47-49 tried to identify Lado's church with the remnants of the church of St Peter and Paul in the nearby village of Ranovac. Cf. M. Riznic, *Manastir Vitovnica*, 12 who says that the stone slab was discovered at the courtyard of Vitovnica. Also cf. I. Prodanovic-Rankovic, *Vitovnica*, in *Spomenicko nasleđe Srbije*, Beograd 1998, 142, br. 105 where is said that the stone slab was taken from the village Oreskovica church, which has been known as the "Armenian church".

²⁶ M. Riznic, *Manastir Vitovnica*, 13.

²⁷ S. Radojcic, *Stare srpske minijature*, Beograd 1950, 50, T. XXXIX, b; M. Harisijadis, *Besenovsko jevandjelje*, in *Likovna Enciklopedija Jugoslavije 1*, Zagreb 1984, 118-119.

²⁸ B. Radojkovic, *Srpski okovi jevangelia XVI i XVII veka*, ZMPU 3-4 (1958), 54, 79-83, sl. 3; B. Radojkovic, *Srpsko*

zlatarstvo XVI i XVII veka, Novi Sad 1966, 110-114, sl. 116; B. Radojkovic, D. Milovanovic, *Srpsko zlatarstvo*, Beograd 1981, br. 97.

²⁹ Q. Stojanovic, *Stari srpski zapisi i natpisi I*, Beograd 1902, br. 588.

³⁰ J. Radovanovic, *Rukopisi frushkogorskih manastira*, in *Frushkogorski manastiri*. Katalog SANU br. 66, Beograd 1990, 360-361. In 19th century F. Kanitz saw in Vitovnica a monastery seal with the year 1703 and the name of the monk Bessarion, cf. F. Kanic, *Srbija. Zemlja i stanovnistvo I*, Beograd 1991, 241; L. Mirkovic, *Starine frushkogorskih manastira*, Beograd 1931, 14-15, br. 14.

³¹ D. Bogdanovic, *Inventar cirilskih rukopisa u Jugoslaviji (XI-XVII veka)*, Beograd 1982, br. 2038, the manuscript: MSPC inv. br. 355.

³² It can be read in the ktitors' inscription, cf. J. Vujic, *Puteshestvije po Srbiji*, II Budim 1828, 96; M. Riznic, *Manastir Vitovnica*, 10, 13. Cf. V. Ristic, *op. cit.*, 212 where he accepts the legend in full and concludes that the church must have been erected as the court chapel of an unknown feudal lord who lived in the nearby castle.

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⁴⁰ S. Popovic, *Krst u krugu*, 338-344.

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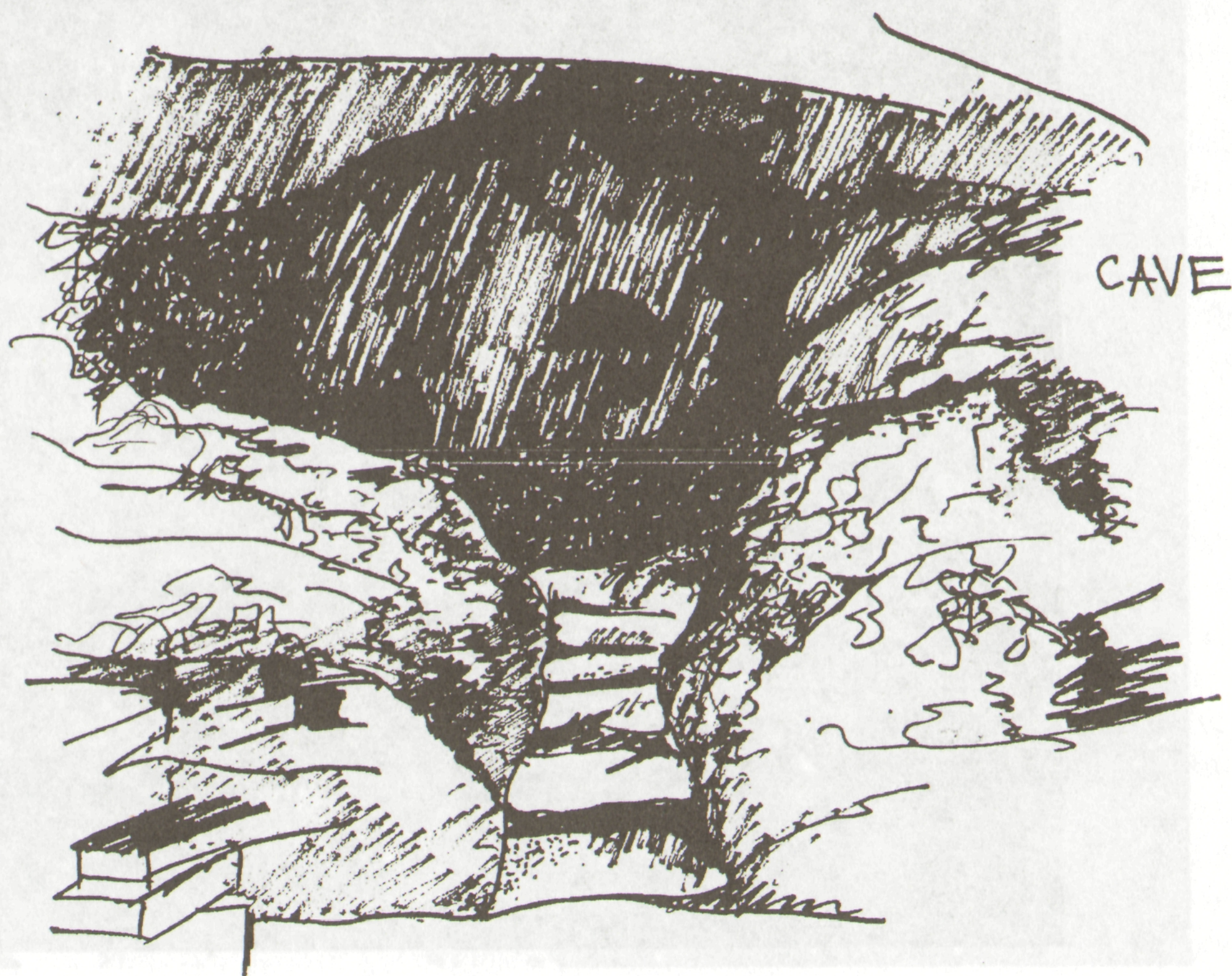
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⁴⁷ Cf. H. Delehaye, *Les Saintes Stylites*, *Subsidia hagiographica* 14, Bruxelles-Paris 1923.

Fig. 1 Hermitage / the rock-shelter



INVESTIGATIONS BY SUBSURFACE RADAR UNDERGROUND ARCHEOLOGICAL OBJECTS IN KYIV PETCHERSKAJA LAVRA, KYIV, UKRAINE

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Abstract: This paper presents preliminary results of nondestructive and remote sensing investigation by ground penetrating radar survey and following computer processing to image subsurface objects with archeological and historical features. The author's research group has conducted this investigation during the summer -autumn period of the 1998 in the famous and oldest monastery of the East Christian church, the Kyiv Petcherskaja Lavra, Kyiv, Ukraine. This place is associated with the earliest Christian culture traditions of the East-European Slavs and a fascinating piece of the Ukrainian history. Many buried structures were located and mapped as results of these investigations including unknown complex system of subsurface tunnels at the depth of 4-9 meters with total length more than 200 meters that demands special additional studies to confirm results of remote sensing. Numerous objects like basements, graves, crypts, ossuaries etc. have been detected and mapped near the rebuilding Uspenskaya Cathedral Church also during the presented studies.

Key words: ground-penetrating radar, radar imaging, archeology, subsurface artifacts.

I. INTRODUCTION

The visualization of hidden objects and others subsurface features in opaque matters (earth, rocks, fresh water, snow, ice, foliage etc.) by non-destructive electromagnetic tools like ground penetrating radar (GPR) or subsurface penetrating radar is of growing importance all around the world [1-3]. Radar survey in microwave range of the 100-1000 MHz is the most appropriate technique, considering depth range, nature of electromagnetic contrast due to differing dielectric constants, required resolution to conduct in non-invasive manner investigation of underground hidden archeological objects [4]. GPR includes computer with special software to process data and image of hidden object to study them [2]. In general this technology is powerful and effective tool among others geophysical techniques like resistivity, seismic, magnetic, metal detectors, gravity etc., that employ to the archeological problems all around the world [5].

So GPR is effective tool for nondestructive testing and remote sensing for wide range applications, including archeology, protection of historical environment and monuments and so on. The preliminary results of investigation conducted by author's research group during the summer-autumn period of the 1998 in the famous and oldest monastery of the East Christian church, the Kyiv Petcherskaja Lavra, Kyiv, Ukraine are presented. The investigation place has long prehistoric and historic occupations.

Variety of subsurface non-documented graves, crypts, archeological galleries, tunnels, caves, underground churches made during the near 1000 years period from AD 800-900 till 1800-1900 can be located there accordingly to numerous non-systematic historic manuscripts and archive materials. Any exact and complete plans, schemas, cartography and maps of this complex subsurface region are absent due to numerous wars and other destructive historical events. Only about of 10% or less of total old subsurface infrastructure are known and used partially at present for demonstrations and by monks lived there. There are many problems caused by ignorance during the last decades the Lavra vital problems to maintain buildings and whole territory in necessary order. The last was during the former USSR times as part of state anti-religious policy and are continued in the force of fund deficit due to permanent economic crisis in Ukraine at present.

A request for electromagnetic exploration by GPR of the historic Lavra place has been received from the Board of Directors of the National Historic and Cultural Reservation *Kyiv Petcherskaja Lavra* in the summer 1998. Other destructive and non-destructive techniques and geophysical methods for underground investigation tested in this place early during the last two decades were not effective there due to site's tremendous complexity. Variety approaches, data collected strategies and processing procedures were being tested and implemented by author to obtain valuable remote sensing GPR information on hidden subsurface objects. The total area of the Lavra is about 22 hectares and only 2-3 % was involved by GPR studies.

The Section II is devoted to a short description of historic, geographic and current state of the Kyiv Petcherskaja Lavra. The used methodology of GPR investigation, including equipment and survey settings and data processing algorithms is presented in the Section III, The Section IV treats some results obtained on the Lavra underground archeological infrastructure during the summer-autumn 1998 investigation. These results give delightful pictures of subsurface artifacts and demonstrate the possibilities of GPR survey with necessary signal processing technique to detect and map and study hidden objects with unique historical and archeological features that are common for such remarkable place.

II. SURVEY SITE BACKGROUND

The study area is located in the oldest part of Kyiv, capital of Ukraine and oldest city of the East Slav world, on higher elevation place near river Dnepr. This place has long prehistoric occupations with numerous archeological evidences. The Kyiv Petcherskaja Lavra is very famous monastery of the East Christian Church from AD 800-900. This monastery had played a key role of this branch of Christian during the many centuries. More than 60 eastern Christian sacred men have lived there and their remains are being kept in the famous Lavra's Far and Near Caves. There are numerous historical and archive data demonstrated that hundreds of eminent persons, i.e. politicians, rulers, military men, religious and cultural workers, scientists had been buried here since 800-1000 till 1900. But location of the most of burial places is unknown at present. The Lavra is famous pantheon of the Ukrainian history.

The high fortress walls, big towers and gates surrounded the Lavra territory for defense purposes (Fig. 1). The Lavra was also during many centuries a key element of the Kyiv's fortification. An about half of the total territory, i. e. the upper part (the left side of Fig. 1), is under direction of the State Historic-Cultural Reservation at present. Other half of territory, the lower territory, belongs to the active Christian monastery renewed since 1990 after three decades interval (the right side in Fig. 1).

The Reservation territory involves famous buildings of churches, the Great Bell Tower, museums and others. The main Cathedral Church, the Uspenskiy Sobor, destroyed during the World War II and rebuilding now, is located there. The territory around the Sobor was main survey place of these studies. The Lavra is under the UNESCO protection as world famous place at present. Total cultural underground layers are about from 2-3 m in average to 6-7 m for some Lavra places. The upper soil layers from the surface level down to the depth of 2-3 m consists of many subsurface tubes, network of pipes etc. Some of these objects are not used and mapped at present but maybe filled with water due to rain etc. Some of active water and heat supplier systems have defects and are caused negative influences on building due to underground water leakage etc.

In general, the Lavra territory is characterized by complex geological and hydrological conditions demanding special cares concerning these subjects but due to mentioned above reasons of political and economic nature whole situation in the Lavra is complex and dangerous for some its places. The foundations of many historical buildings and total buildings are degraded due to namely uncontrolled subsurface objects and underground water influences. There are fall-throughs of soils on the whole territory of tremendous total volume of about 10-20 m³, Large cracks are visible on the building walls from the ground to the roof.

These facts and numerous others are indirect indication on presence of complex unknown subsurface infrastructure. For example, the main Lavra powder magazine had been located outside of the fortress wall in the special Powder Tower (Fig. 1) and connected with the fortress by subsurface tunnel that is unknown at present at all.

III. RESEARCH METHODOLOGY

As mentioned above, a ground-penetrating radar (GPR) was being used as principal research tools during the presented studies. Common GPR system includes three-principle component: active sensor unit, control electronics unit and computer with corresponding software (Fig. 2) [2]. Active sensor or transducer includes transmitter and receiver with their antennas, located on surface that is border between air and opaque media. An own designed and manufactured GPR prototype system has been used for investigations, including all software for data processing.

Operation of subsurface radar is similar to common air-operating radar excepting some distinctive features caused by subsurface sounding. The GPR survey involves the line transects so that spatial extent of the subsurface objects can be estimated [1]. In each point of trace we obtain radar return signal called signal of trace (trace signal). Radar data recorded along some transect line laid over searching territory can be presented as a 2-D image by vertical displacement of neighbor traces (Fig. 3 a). Various forms of presentations and modern computer graphic opportunities can implement visual perception of those 2-D images (Fig. 3b).

Original radar image of subsurface regions is corrupted strongly by diffraction wave effects due to the fact that wavelengths of microwave band used are comparable with characteristic geometrical sizes of geological subsurface features and buried objects (Fig. 4). In general, choice of electromagnetic spectrum applied for subsurface sounding results from trade-off considerations. The higher is operational frequency, the higher is spatial resolution achieved. But, at the same, the lower is depth of signal propagation through the Earth due to attenuation increasing simultaneously with growth of operation frequency.

So, for such trade-off choice of operational frequency spectrum, the strong, unwanted but unavoidable, diffraction events take place that demands special radar responses processing technique discussed later. For illustration, the left side of Fig. 4 contains typical geometry of solved problems for dense subsurface objects buried under the Earth surface in Fig. 4a like water lens, graves, old foundation, metal structure etc. and in Fig. 4b for hollow objects like caves, cavities, voids etc. The right sides of Fig. 4 shows simulated radar return signals transformed in 2-D images by computer.

As seen in Fig. 4, there is effective method to classify qualitatively two types of described above subsurface objects by analyzing phase of reflected signals from upper part and lower part of hidden object in accordance to phase of sounding signal as depicted in Fig. 4. This model was used during these investigations in order to classify of buried man-made archeological structures.

Besides diffraction there are also influence of background noise, multipath and lateral wave, background scattering and interference signals to make worse radar data [2]. An adequate data processing is necessary to obtain radar image with valid geometry from degraded image and to enhance picture quality for better visual analysis and perception by interpreter that is achieved by the 1-D and 2-D processing of GPR data [3,5]. Optimal sets of used 1-D and 2-D data processing procedures have been estimated empirically.

The GPR data interpretation should be based on psychological phenomena of human sighting and pattern recognition namely. The last are more powerful, effective and universal mean than achieved computer ability to recognize real complex radar survey data especially concerning archeological subsurface structures.

IV. SOME RESULTS ON SUBSURFACE ARCHEOLOGICAL STUDIES

The GPR surveys were conducted on the upper territory of the Lavra that is under direction of the National Historic and Cultural Reservation *Kyiv Petcherskaja Lavra*. The research purposes are to study a presence of subsurface archeological objects there that were unknown before. Researched area is no more than 2-3% of the total territory, as mentioned above, near the main Lavra Cathedral Church, the Uspenskiy Sobor, that is rebuilding now and the Building No.4 where lived highest monastery staff in the past (Fig. 1). Many transects were used during of conducted studies. Delightful results of transect ## 1,2,3 shown in Fig. 1 are considered and analyzed in this Section. Some of the most remarkable subsurface objects among of variety of detected and mapped along these transects are presented and discussed here.

A long transect # 1 of the total length of about 100 meters was laid along the territory of internal court of the Building No. 4 (Fig. 1). Fig. 5 shows the GPR records obtained along this transect by using the GPR system with the 500 MHz impulse transducer.

Gray-scaled pallet is applied here in this paper to present research results while some color palettes due to graphical capabilities of modern computer were being used also and effective on the base of physiological peculiarities of visual information perception. The computer data processing for compensation of inherent diffraction effects and other image focusing and improving technique were being employed widely. Diffraction compensation is necessary to estimate exactly geometry of subsurface region with hidden objects in it. Moreover, diffraction effects allow detecting small sized objects and to discriminate some objects by their specific diffraction shape of radar return.

Fig. 5 demonstrates wonderful indications on existence under the survey territory around the Building No. 4 the two subsurface galleries of total length of about 100 meters each. Before the presence and location of these sub-horizontal tunnels were unknowns really excepting nonsystematic, incomplete and semi-legendary data without any documented confirmations. But signs of three large holes in ground on this territory covered now with earth and rocks are observed there as indirect evidence of complex subsurface structure and dangerous geological situation.

The first upper tunnel in Fig. 5 is located at the depth of 4-6 meters from ground surface while the second, lower tunnel, is below at the depth of 7-8 meter. The upper tunnel is air-filled inside that is evident from the analysis of the phase of reflected signals from the ceiling of tunnel and its floor as seen in Fig. 6. The enlarged two fragments of the data in Fig. 5 for 50-90 meters range along transect #1 is presented in Fig. 6. It is clear that the upper gallery is hollow inside that follows from comparison of simulated data in Fig. 4 and real field data in Fig. 6. The internal properties of second tunnel are less clear due to its deeper position and some shielding due to the first tunnels. There are also many other subsurface structures connected to these two tunnels like one that presented in Fig. 6. Some of those subsurface objects are maybe subsurface room and lateral tunnels.

Other results of studies in this remarkable place present GPR survey (transects #2,3 in Fig. 1) of internal (transect #2) and external territory (transects #3,4) of the Uspenskiy Sobor. There are two main categories of detected subsurface objects there. The first category includes subsurface tunnels to the Sobor from surrounding buildings (the Great Bell Tower, the Building No. 4 and others). The second category presents numerous burial places around and into territory of the Sobor. The subsurface tunnels near the Sobor are namely destroyed and covered by earth due to explosion of the World War II times and current complex geological and hydrological situation there. Only small segments of those subsurface tunnels are hollow inside and total picture is very differed from considered above situation near the Building No. 4.

As stated above in the Section I the whole internal and external territory of the Uspenskiy Sobor has been used during more than 1000 years period as honor burial place. So numerous graves, crypts and vaults were detected and mapped there in the act of GPR survey. Fig. 7 shows two demonstrative examples of those subsurface archeological objects after simple computer processing to improve quality of radar imaging. A crypt located in the internal territory of the Sobor is depicted in Fig. 7a. A crypts placed outside the Sobor is depicted in Fig. 7b. Only history of the burial place in Fig. 7b is known approximately due to some archive data stated that this crypt belongs to the famous family of Olshanskiy Princes (about 14-17 centuries).

CONCLUSIONS

Some buried structures were located and mapped as results of this preliminary investigation including some remarkable objects presented above. Author's common investigations with historians, archeologists and surveyor services of the National Historic and Cultural Reservation *Kyiv Petcherskaja Lavra* will be continued in the near future. The special working group and complex researches laboratory will be organized in order to begin full-scale investigations in the *Kyiv Petcherskaja Lavra*. Information obtained from these studies will be used for preparation of the pilot 1999 investigation project to saving this unique place of world culture and history.

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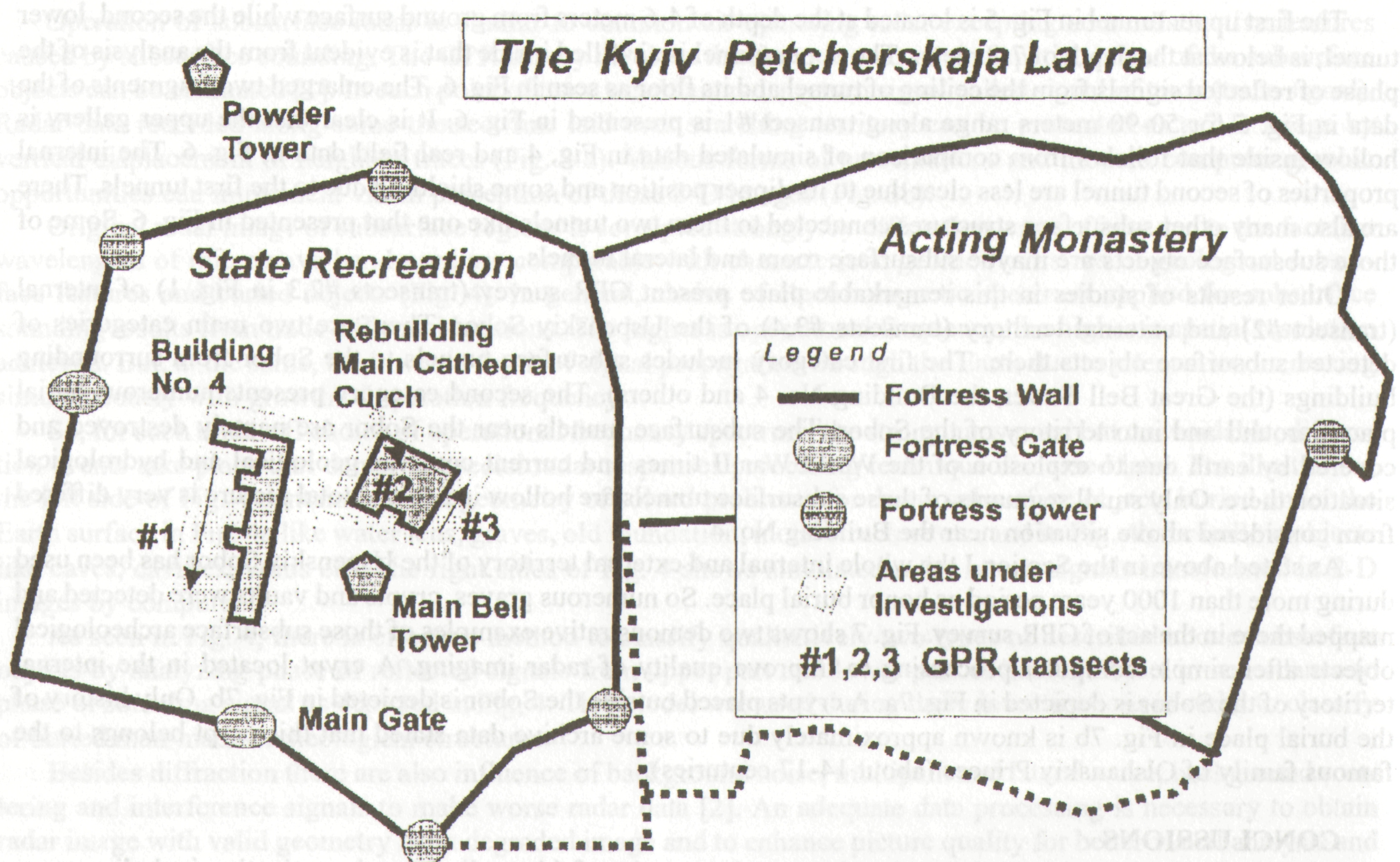
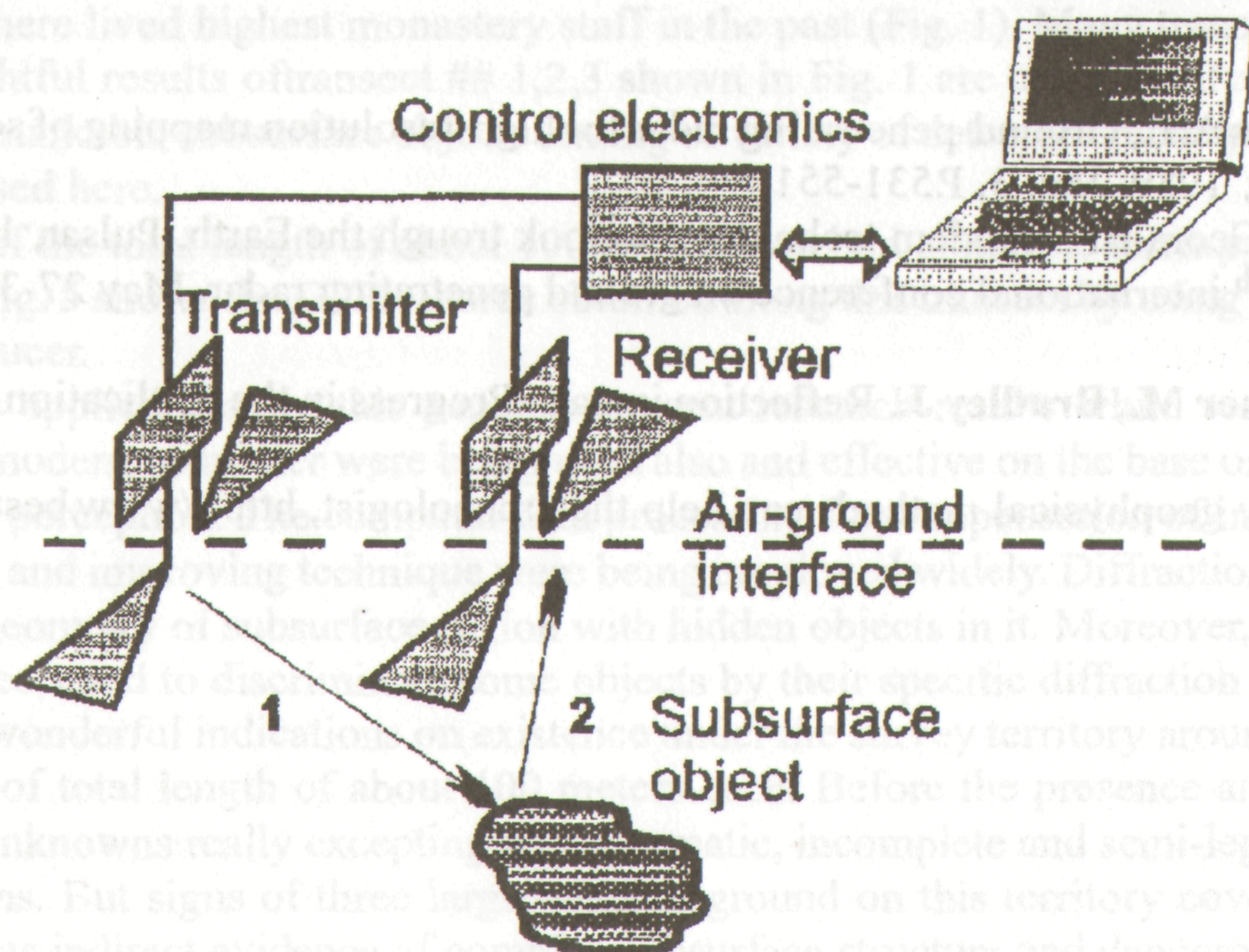


Fig. 1. Schematic plan of the Kyiv Petcherskaja Lavra, Kyiv, Ukraine, that consists of two parts: National State Recreation (left part) and acting East Christian Church Monastery (right part).

Fig. 2. Key features of ground penetrating radar survey to study subsurface media: 1 - sounding signal; 2 - scattering signal.



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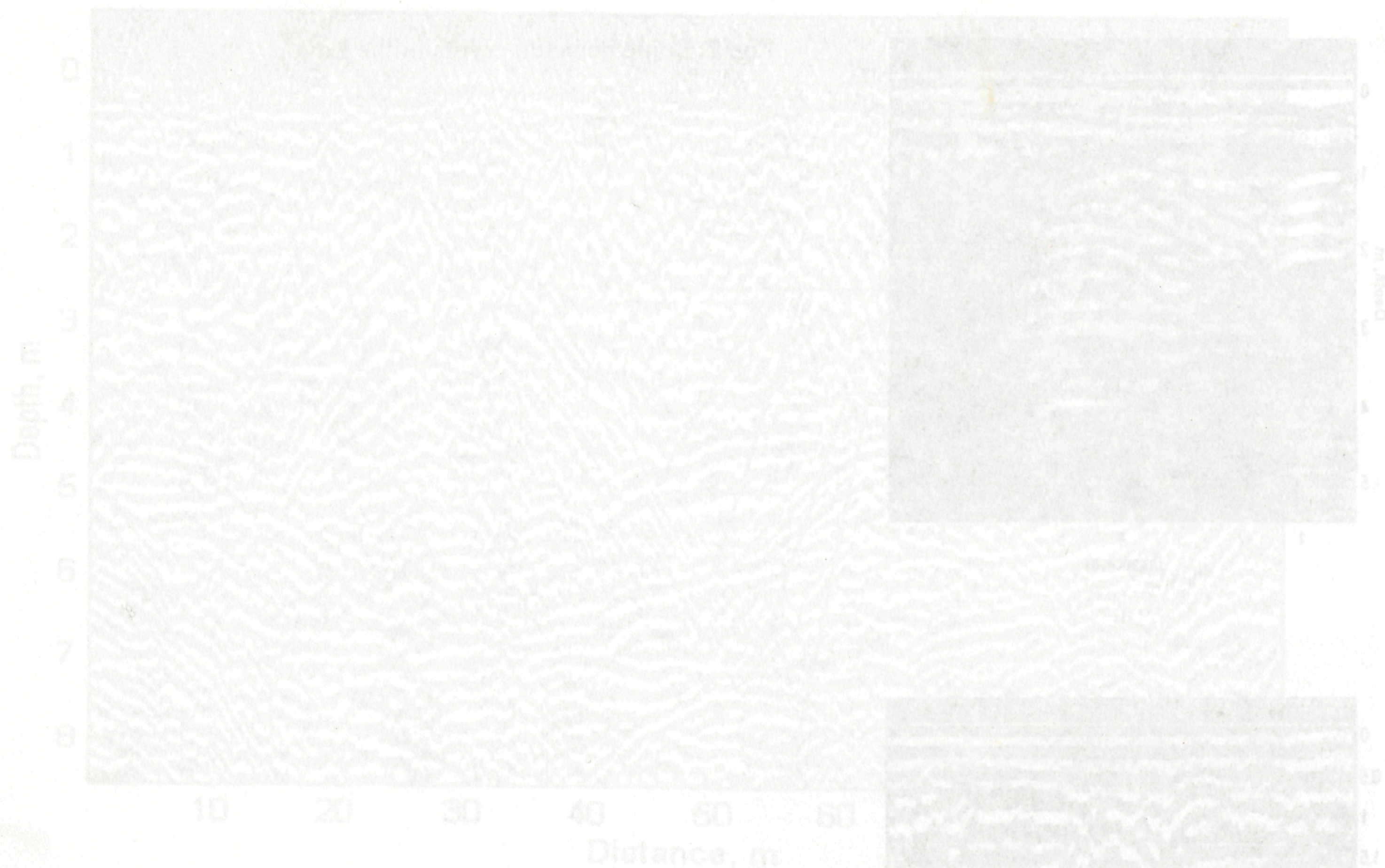


Fig. 5. Subsurface tunnels detected by GCR along #1 near the building

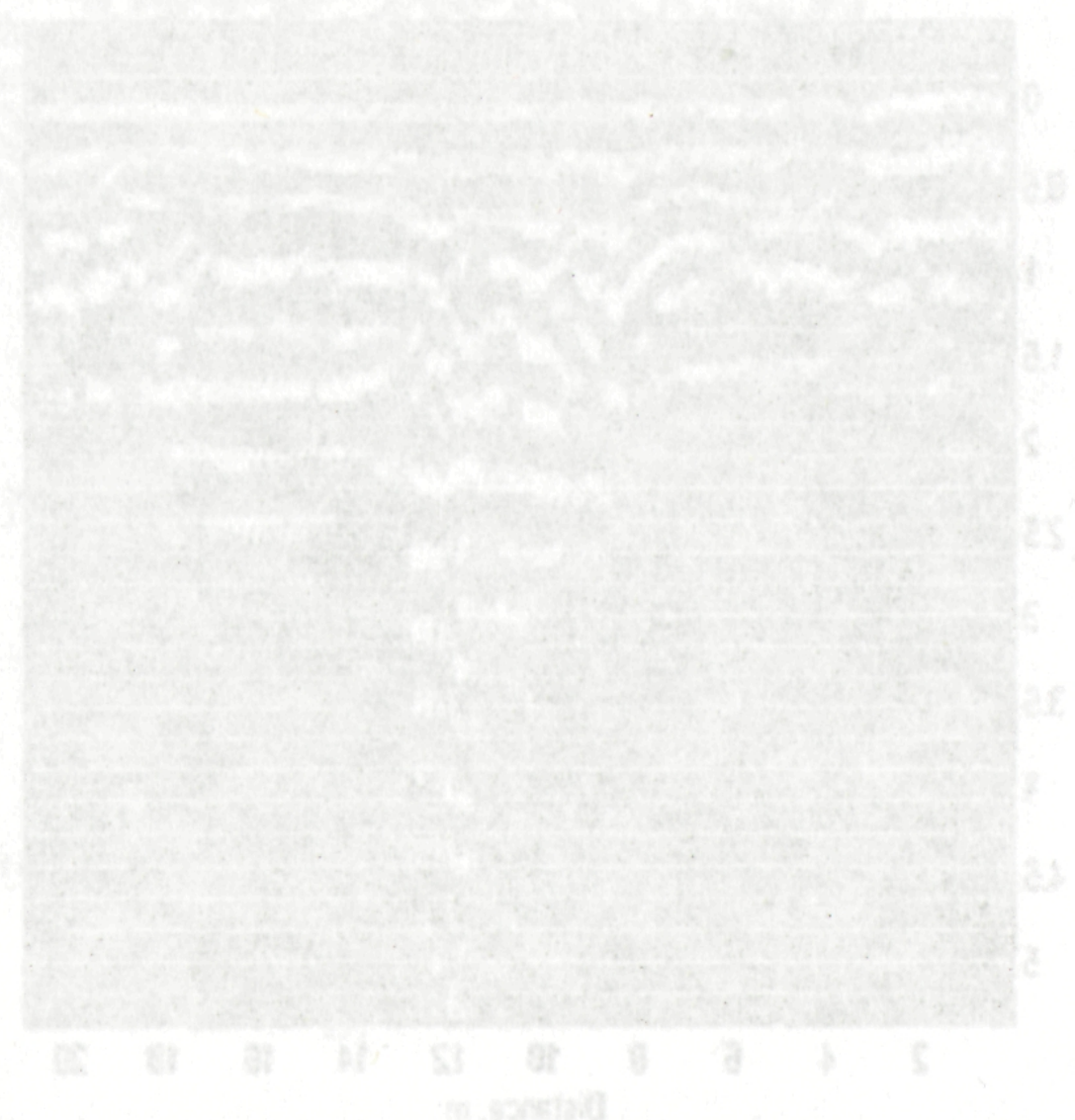


Fig. 6. Enlarged fragment of the subsurface tunnel #1 (Fig. 5) to detail it

СКАЛНИ И МЕГАЛИТНИ ПАМЕТНИЦИ – ПРОБЛЕМИ И ПЪТИЩА ЗА ТЯХНОТО РАЗРЕШЕНИЕ

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